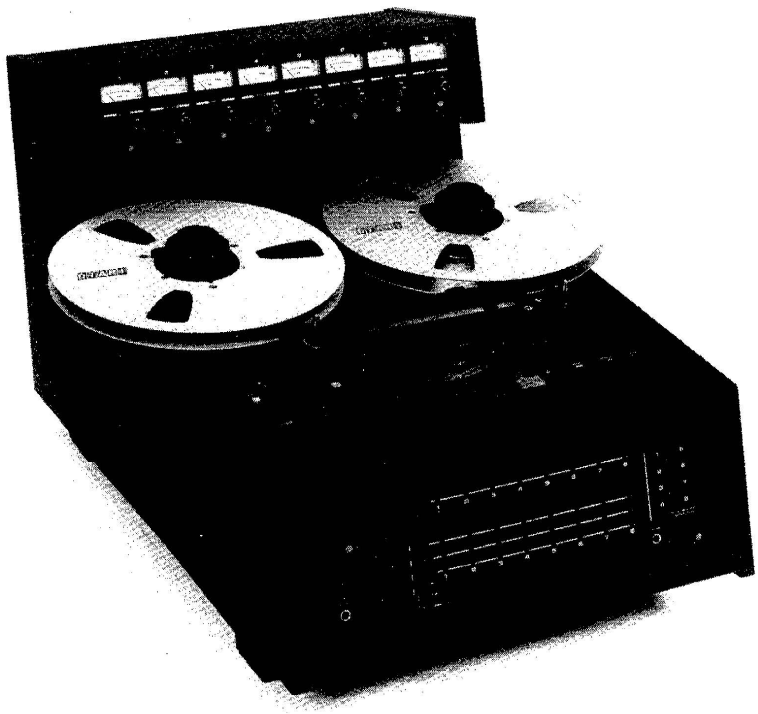
Parts No.CS3-033

OTARI®

MX-5050 MK III-8

PROFESSIONAL RECORDER

INSTRUCTION AND MAINTENANCE MANUAL



Edition No.1

Issued: May.1984

CAUTION

To prevent fire or shock hazard:

Do not expose this appliance to rain or moisture.

Do not remove back.

No user-serviceable parts inside.

Refer servicing to qualified service personnel.

1987.June.08.

SUBJECT:

Lubrication of DD capstan motor.

APPLICABLE TO:

MX-5050*,MX-70,MX-80,MTR-10/12,MTR-20,BTR-5 and BTR-10.
(*Except early MX-5050 which has belt drive capstan motor.)

LUBRICATION OIL:

ANDEROL 456--------OTARI Parts No. PZ9E003
NO other oil should be used.

LUBRICATION PROCEDURE:

MX-5050, MX-70,MX-80,MTR-10/12 and BTR-10
---These motors have a foam-ring surrounding the top of the brass bearing.
1. Remove dust cap from the capstan motor.
2. Apply 1 or 2 drops of oil.

MTR-20 and BTR-5
---These motors have a felt-pad on top of the brass bearing.
1. Remove plastic dust cap from the motor.
2. Apply 1 or 2 drops of oil.

NOTICE:

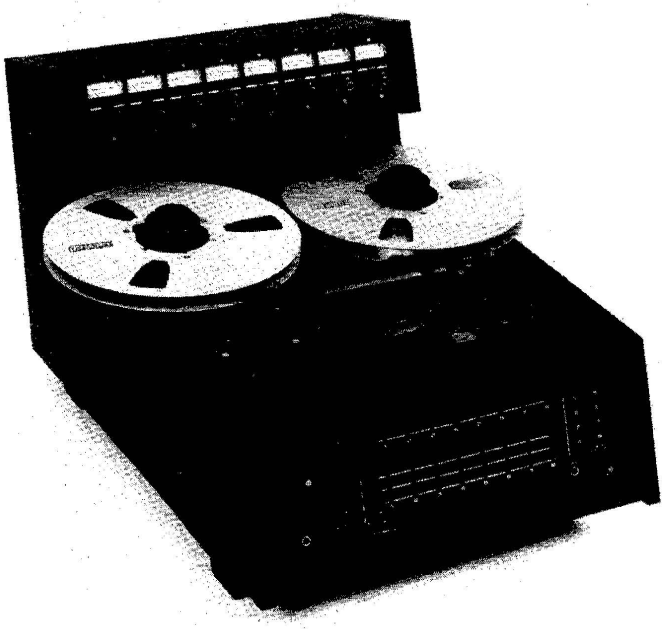
1. Lubrication should be done after approximately 1,000 hours of operation or every 6 months depending on machine usage.
2. Don't over lubricate and don't apply oil to the part of the capstan shaft which has contact with the tape.
3. This oil will be included with each machine shipped after July 1st,1987.

MX-5050 MKⅢ-8

PROFESSIONAL TAPE RECORDER

INTRODUCTION

This manual provides descriptive information, installation, operation, maintenance and normal adjustment instructions for the Otari MX-5050 MKⅢ-8 Proffesional Tape Recorder.



MX-5050 MKⅢ-8 Recorder

COMMUNICATION WITH OTARI
—FOR SERVICE INFORMATION AND PARTS—

OTARI PRODUCTS are manufactured under strict quality control and each unit is carefully tested and inspected prior to shipment from our factory.

If, however, adjustment or technical support becomes necessary, replacement parts are required or technical questions arise, please contact your nearest Otari dealer or write to:

OTARI ELECTRIC CO., LTD.

4-29-18, Minami Ogikubo,
Suginamiku, Tokyo, 167, Japan
Phone: (03) 333-9631
Telex No.: OTRDENKI J26604

OTARI CORPORATION

2 Davis Drive, Belmont
California 94002, U.S.A.
Phone: (415) 592-8311
Telex No.: TWX 910-376-4890

OTARI ELECTRIC DEUTSCHLAND GmbH

Gielen Strasse
4040 Neuss 1
F.R. Germany
TEL :02101-274011 , 12
TLX :418517691

Another part of Otari's continuous technical support program for our products is the continuous revision of manuals as the equipment is improved or modified.
In order to receive information and service applicable to your equipment, and for technical support to function properly, please include the following information, most of which can be obtained from the nameplate on the equipment when you communicate with Otari.

1. Model Number
2. Serial Number
3. Date of purchase
4. Name and address of dealer from whom unit was purchased
5. Power requirements (voltage and frequency)
6. Manual number to which you are referring

SAFETY INSTRUCTIONS

1. Read Instructions -- All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions -- The safety and operating instructions should be retained for future reference.
3. Heed Warnings -- All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow Instructions -- All operating and use instructions should be followed.
5. Water and Moisture -- The appliance should not be used near water - for example, near a bathtub, washbowl, kitchen sink, laundrytub, in a wet basement, or near a swimming pool, etc.
6. Carts and Stands -- The appliance should be used only with a cart or stand that is recommended by the manufacturer.
7. Ventilation -- The appliance should be situated so that its location or position does not interfere with its proper ventilation.
   For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
8. Heat -- The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
9. Power Sources -- The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
10. Grounding or Polarization -- The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
11. Power-Cord Protection -- Power-supply cords should be routed so that they are not likely to be walked on pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
12. Cleaning -- The appliance should be cleaned only as recommended by the manufacturer.
13. Nonuse periods -- The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
14. Object and Liquid Entry -- Care should be taken so that objects do not fall and liquids are spilled into the enclosure through openings.
15. Damage Requiring Service -- The appliance should be serviced by qualified service personnel when:
    A. The power-supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits marked change in performance; or
16. Servicing -- The user should not attempt to service the appliance beyond that described in the operating instructions.
    All other servicing should be referred to qualified service personnel.

TABLE OF CONTENTS

Section	Title	Page
1	GENERAL INFORMATION	
1-1	System Description	1-1
1-1-(1)	Tape Transport	1-1
1-1-(2)	Record/Reproduce Electronics	1-3
1-2	Standard Accessories	1-4
1-3	Optional Accessories	1-4
1-4	Specifications	1-5
2	INSTALLATION	
2-1	Unpacking and Inspection	2-1
2-2	Location and Environment	2-2
2-3	Dimensions	2-3
2-4	Standard Switch Position on Shipment	2-4
2-5	Power and Signal Connection	2-5
2-5-(1)	AC Power Connection	2-6
2-5-(2)	Signal Connections	2-7
3	OPERATION	
3-1	Controls and Indicators	3-1
3-2	CB-110 Remote Control Unit Operation (Option)	3-14
3-3	Operating Information	3-14
3-3-(1)	Using the Reel Hold Down Knobs	3-14
3-3-(2)	Pre-Operating Procedure	3-15
3-3-(3)	Reproduction	3-17
3-3-(4)	Normal Recording	3-17
3-3-(5)	Recording with Selective Reproduction	3-18
3-3-(6)	Fast Winding	3-20
3-3-(7)	Editing and Splicing Tape	3-20
4	GENERAL INFORMATION OF MAINTENANCE	
4-1	Test and Maintenance Equipment Requirements	4-1

CONTENTS

5	ROUTINE MAINTENANCE AND CONVERSION INFORMATION	
5-1	Routine Maintenance	5-1
5-1-(1)	Cleaning	5-1
5-1-(2)	Demagnetizing	5-3
5-1-(3)	Lubrication	5-4
5-2	Tape Replacement	5-6
5-3	Equalizer Change	5-6
5-4	Line Voltage Conversion	5-7
5-5	Fuse Replacement	5-7
6	TAPE TRANSPORT MAINTENANCE	
6-1	Transport Access	6 1
6-2	Brake Adjustment	6-2
6-3	Capstan Pinch Roller Pressure Adjustment	6-5
6-4	Tape Speed Adjustment	6-7
6-5	Tape Transport Timing Chart	6-8
6-6	Recording Process Timing Chart	6-9
7	PERFORMANCE TESTING AND ELECTRONIC ALIGNMENT	
7-1	General Notice	7-1
7-2	Test Tapes	7-1
7-3	Test Conditions	7-2
7-4	Performance Tests	7-3
7-4-(1)	Overall Signal-to-Noise	7-3
7-4-(2)	Overall Distortion Test	7-5
7-4-(3)	Crosstalk Test	7-6
7-4-(4)	Erasure Test	7-7
7-4-(5)	Tape Speed Measurement	7-8
7-4-(6)	Flutter and Wow Test	7-9
7-5	Access to Electronics Assembly	7-12
7-6	Electronic Alignment	7-13
7-6-(1)	Reproduce System	7-13
7-6-(2)	Reproduce Head Azimuth Adjustment	7-14
7-6-(3)	Frequency Response	7-15
7-6-(4)	SRL (Repro Level) Adjustment	7-17
7-6-(5)	SEL/REP. Level Adjustment	7-17
7-6-(6)	Record System	7-17

7-6-(7)	Record Head Azimuth Adjustment	7-17
7-6-(8)	Record Bias Adjustment	7-18
7-6-(9)	Overall Frequency Response	7-22
7-6-(10)	Monitor Input Level and VU Meter Level Adjustment	7-23
7-6-(11)	Test Osc Level Adjustment	7-24
7-6-(12)	Record Level Adjustment	7-25
7-6-(13)	Peak Indicator Trigger Level Adjustment	7-25
7-6-(14)	Stand-by Function	7-26
8	MAJOR COMPONENT REPLACEMENT	
8-1	Reel Motor Assembly Replacement	8-1
8-1-(1)	Reel Table Replacement and Height Adjustment	8-1
8-1-(2)	Reel Motor Replacement	8-2
8-1-(3)	Brake Arm Assembly and Brake Solenoid Replacement	8-3
8-2	Power Transformer Replacement	8-4
8-3	Capstan Motor Replacement	8-4
8-4	Pinch Roller Replacement	8-5
8-5	Head Assembly Replacement	8-6
8-5-(1)	Description	8-6
8-5-(2)	Head Stack Replacement	8-7
8-5-(3)	Record and Reproduce Head Adjustment	8-9
8-5-(4)	Erase Head Alignment	8-9
9	TROUBLESHOOTING	
9-1	Preliminary Procedures	9-1
9-2	Troubleshooting Hints	9-1
10	PARTS LISTS AND SCHEMATICS	
10-1	Safety Component	10-2
10-2	Assembly Hardware Coding	10-3
10-3	Parts Lists and Exploded View	10-4
10-4	Pin Identification	10-30

CONTENTS

LIST OF ILLUSTRATIONS AND TABLES

Figure	Title	Page
1-1	MX-5050 MKⅢ-8 Major Components	1-2
2-1	Dimensions	2-3
2-2	Rear Panel	2-4
2-3	Input/Output Assembly Connector Wiring	2-8
3-1	Connection of Remote Control Unit	3-14
3-2	Reel Hold Down Knob	3-15
3-3	Tape Threading	3-16
3-4	Tape Splicing Block	3-21
5-1	Lifting the Head Cover	5-2
5-2	Demagnetizing	5-4
5-3	Lubrication	5-5
5-4	Voltage Selection Terminal	5-7
5-5	Main Power Fuse Location	5-8
5-6	Internal Fuse Location	5-9
5-7	Rotating Control P.C.B.	5-10
6-1	Tape Transport Access	6-1
6-2	Brake Measurement	6-4
6-3	Brake Assembly Location	6-4
6-4	Pinch Roller Pressure Measurement	6-6
6-5	Pinch Roller Pressure Adjustment	6-6
6-6	Capstan Servo Control P.C.B.	6-7
6-7	Control Timing Chart	6-8
6-8	Recording Process Timing Chart	6-9
7-1	Filter Schematics	7-3
7-2	Test Tape Loading	7-9
7-3	Electronics Access	7-12
7-4	Reproduce System Block and Level Diagram	7-13
7-5	Head Assembly	7-14
7-6	Location of Record/Reproduce Electronics	7-16
7-7	Overall Frequency Response	7-19
7-8	Record System Block and Level Diagram	7-20
7-9	Bias Current v.s. Output and Distortion	7-20

Figure	Title	Page
7-10	Input v.s. Output and Distortion	7-21
7-11	Location of Record/Reproduce Electronics	7-21
7-12	Location of AMP. Control Electronics	7-24
8-1	Reel Motor Mounting	8-1
8-2	Brake Assembly	8-2
8-3	Location of DC Servo Capstan Motor	8-5
8-4	Pinch Roller Removal	8-6
8-5	Head Assembly	8-8
8-6	Head Alignment	8-8

Table	Title	Page
1-1	Standard Accessories	1-4
1-2	Optional Accessories	1-4
1-3	Specifications	1-5
2-1	Standard Switch Position on Shipment	2-4
2-2	Rear Connector Panel	2-5
3-1	Tape Transport Controls and Indicators	3-1
3-2	Record/Reproduce Electronics Controls and Indicators	3-7
4-1	Test and Maintenance Equipment	4-1
4-2	Flutter Test Tapes	4-2
4-3	Reproduce Alignment Test Tape	4-2
5-1	Record Level	5-6
5-2	Fuse Information	5-9
6-1	Braking Force Specifications	6-3
7-1	Signal-to-Noise Specifications	7-4
7-2	Flutter and Wow Specification	7-11
7-3	Equalizer Time Constants & Fluxivity	7-16
7-4	Standard Level	7-24
9-1	Troubleshooting Hints for Amplifiers	9-2
9-2	Troubleshooting Hints for Transport	9-2
10-1	Safety Component	10-2

SECTION 1
GENERAL INFORMATION

The MX-5050 MKⅢ-8 Recorder is a professional quality two-speed audio tape recorder/reproducer, designed for optimum performance and long life.
It accommodates a 1/2-inch wide tape and two 7 1/2 ips (19.05 cm/sec.) and 15 ips (38.1 cm/sec.) tape speeds.

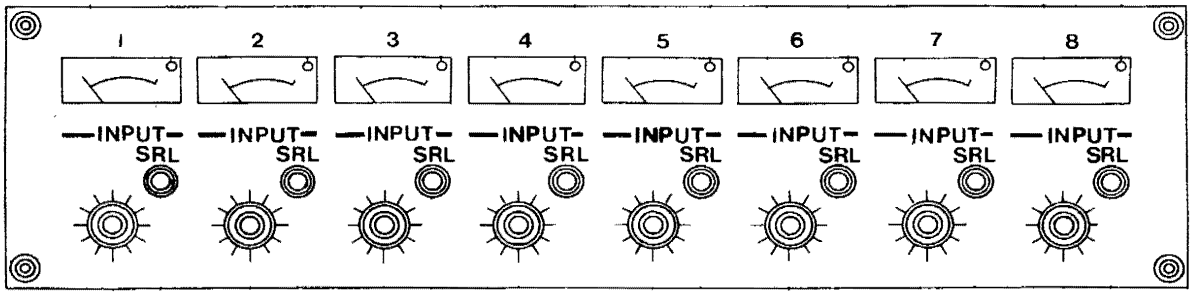
1-1 SYSTEM DESCRIPTION

Among the many professional features of the MX-5050 MKⅢ-8 are: selective reproduction (SEL/REP), automatic motion sensing control by a proprietary microprocessor, an edit control that permits tape spilling, dynamic braking, an electronic tape timer, an adjustable cueing control for audible monitoring in fast forward and rewind, a dual frequency built-in test and cue-tone oscillator, adjustable record bias, equalization and level controls, XLR type connectors for input and output lines, stand-by mode for ease of multichannel recording, remote controllable electronics, a VU meter with a peak indicator for each channel, selecting switches for input and output levels, and a memory stop for automatically stopping the tape at a desired position except in record mode.

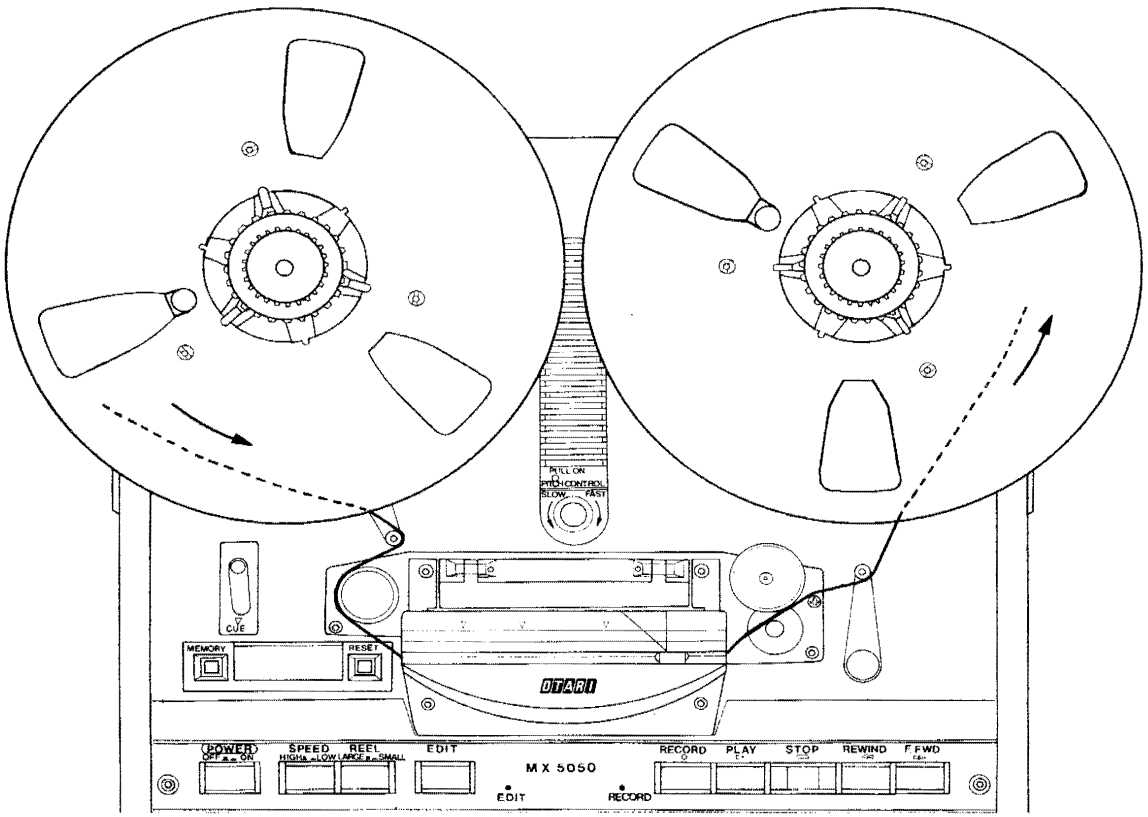
1-1-(1) TAPE TRANSPORT

All components of the tape transport system are mounted on a rigid aluminium base for stability.
The transport design incorporates two 6-pole induction motors for the tape reels and a dc servo motor (Direct drive) for the capstan.
A pitch control is available to adjust the control range of the tape speed within $\pm$7% of the nominal speed for sound application.
In addition to the editing controls, a tape-splicing block (Figure 3-3) mounted on the head cover holds the tape for easy editing, cutting, and applying splicing tape.
Momentary contact pushbutton switches on the transport are used to select operational modes: record, play, stop, rewind, fast forward, and edit.

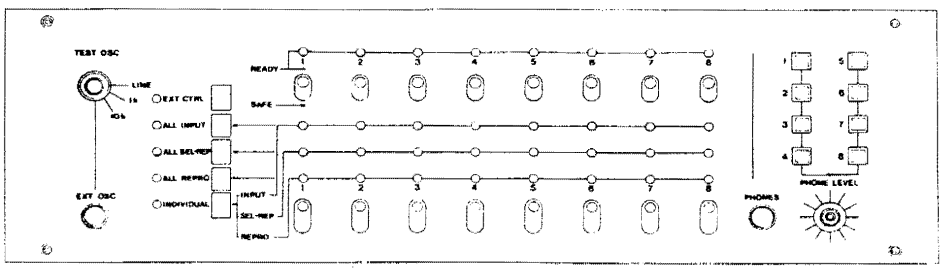
These modes except edit mode can be controlled by using an optional remote control unit. (as shown in Table 1-2)



Amplifier



Transport



Amplifier Controls

Figure 1-1 MX-5050 MKⅢ-8 Major components

1-1-(2) RECORD/REPRODUCE ELECTRONICS

FEATURES

(1) The RECORD/REPRODUCE amplifier unit is interconnected to the transport unit by just the connectors.

(2) Available sound applications are a SEL/REP. function for overdubbing: SOUND WITH SOUND, SOUND ON SOUND, etc., carried out by the PUNCH-IN and PUNCH-OUT functions of the transport control.

(3) Both input and output level select switches are provided on the printed circuit board to select either input or output level.

(4) For optimum performance corresponding to the tape used, the Record bias, level, and equalizer controls can be accurately adjusted from the rear panel.

(5) Low frequency compensation controls are provided for possible accurate alignment of low frequency characteristics to meet the tape to be used.

(6) For ease of multi-channel recording, the monitor program of record-ready channels are automatically switched to input during fast-forward, rewind, or stop modes.
This function is able to be selected with the stand-by switch on the rear panel.

(7) Remote control is available with optional two-type Remote control units.

1-2 STANDARD ACCESSORIES

The MX-5050 MKⅢ-8 is supplied with the standard accessories listed in Table 1-1.

Table 1-1 Standard Accessories

Description	Quantity	Otari Part Number
Power Cord	1	PZ9D003
NAB Hub Reel Hold Down Knob (10 1/2'')	2	KWOHC
NAB Empty Reel (10 1/2'')	1	ZA-51H
Instruction & Maintenance Manual	1	OS3-033

1-3 OPTIONAL ACCESSORIES

Available optional accessories are listed in Table 1-2.

Table 1-2 Optional Accessories

Description	Otari Part Number
Remote Control Unit (Transport and amplifier and timer)	CB-110
Remote Control Unit (Transport)	CB-114
Cleaning kit	ZA-51B
Tape Deck Pedestal	ZA-52L
Extension Board Ass'y	PB-77Y

1-4 SPECIFICATIONS

The specifications of the MX-5050 MKⅢ-8 are as listed in Table 1-3.

Table 1-3 Specifications

Tape Width and Tracks:	1/2 inch (12.7 mm) tape 8 tracks (0.04 inch or 1.0 mm track width)
Tape Speeds:	7 1/2 and 15 ips (19.05 and 38.1cm/sec.) Maximum deviation: ±0.2% measured with 1.5 mil (0.038 mm) tape
Reel Sizes:	1/2 × 10 1/2 inch NAB.
Heads:	Three eight track in-line: erase (ferrite), record, reproduce (both hard permalloy)
Motors: Capstan:	DC servo controlled motor (Pitch control range ±7%)
Reels:	Two torque motors
Rewind Time:	Approximately 100 seconds for 2,500 ft (760 m) NAB reel
Operating Position:	Horizontal (Tabletop type)
Power Requirements:	100,117,220, 240 volts, 50 or 60 Hz, single phase AC.
Power Consumption	150 watts
Operating Environment:	40° to 104°F (5° to 40°C) 20% to 80% Relative Humidity

Storage Environment:	-5° to 113°F (-20° to 45°C)
Dimensions and Weight:	Dimensions:438 mm width, 675mm depth, 438 mm height. 17.3 " width, 26.6" depth, 17.3" height Weight: 35 kg, 77 lbs.
Mounting	Colored leatherette-finished cabinet.
Remote Control Unit:	CB-110 Remote control unit (remote control functions of transport and amplifier and timer) CB-114 Remote control unit (remote control function of transport)
Connectors:	LINE INPUT, LINE OUTPUT: standard three-pin XLR. EXT OSC: standard single-conductor phone jack PHONES: standard two-conductor phone jack
Inputs: LINE:	Variable or fixed level front panel switch selectable, unbalanced 50 kohm. Fixed level: +4 dBm or -8 dBm switchable. (Minimum -9 dBm or -18 dBm)
EXT OSC:	Minimum -18 dBm, unbalanced 10 kohm.
Outputs: LINE:	Fixed level: +4 dBm or -8 dBm rear panel switch selectable. Load impedance: more than 600 ohm. Maximum line output level: +21 dBm with 600 ohm load.
Headphone Jack:	-19 dBm with an 8 ohm load Load impedance: 8 ohm or greater

Equalization:	NAB or IEC for 7 1/2 and 15 ips.
Frequency Response:	REC/PLAY 15 ips: 40 Hz to 25 kHz ±2 dB 7 1/2 ips: 20Hz to 20 kHz ±2 dB SEL/REP 15 ips: 40Hz to 15 kHz ±3 dB 7 1/2 ips: 30Hz to 10 kHz ±3 dB Specifications refer to a 1 kHz reference when recorded on 3M #226.

Signal to noise ratio:

Tape speed \ EQ.	NAB		IEC	
	Weighted	Unweighted	Weighted	Unweighted
15 ips	70 dB	66 dB	70 dB	66 dB
7 1/2 ips	70 dB	66 dB	70 dB	66 dB

Crosstalk:	greater than 55 dB
Wow and Flutter:	NAB weighted: 15 ips: less than 0.05% 7 1/2 ips: less than 0.06%
Distortion:	less than 0.5% at 1 kHz at 250 nWb/m.
Erase Efficiency:	greater than 70 dB.
Test Oscillator Frequency:	Nominal 1 kHz and 10 kHz.
Bias and Erase Frequency:	200 kHz
Peak indicator:	Trigger level: 1040 nWb/m (15 dB above AMPEX operating level) recorded flux level.

Notes:

1. Signal to noise ratio is measured with respect to a recorded level of 1,040 nWb/m to biased tape noise when using 3M #226, magnetic tape.
   Unweighted: Using a 30 Hz to 18 kHz RC filter to eliminate noise outside the audio spectrum.
   Weighted: Using an NAB or ASA "A" weighting filter and a 1 kHz reference.

2. Main schematic diagrams are at the end of this manual.

3. OTARI reserves the right to change specifications without notice and/or obligation.

SECTION 2
INSTALLATION

This section of the manual provides information on unpacking and inspection, location and environment, and power and signal connections.

2-1 UNPACKING AND INSPECTION

The MX-5050 MKⅢ-8 system is shipped from the factory in a single cardboard packing case.
Upon receipt, examine the case for any sign of damage.
Unpack the equipment and inspect for any sign of damage.
Use great care when unpacking the equipment and removing packing materials to prevent damage to critical components such as the capstan, head assembly, and tension arms.
Referring to Table 1-1 and Table 1-2 (as applicable), verify that all items have been received.
Report any shortage or damage to the carrier and your local Otari dealer.
Save the packing case for possible shipment of the equipment to another location or in case of reshipment.
Other packaging may cause damage during transportation and will void the warranty.
Regarding the repacking method, please refer to the illustration which is attached to a flap of the packing box.

2-2 LOCATION AND ENVIRONMENT

The area chosen for operation should be adequately ventilated and dust free.
Since recording is by an electromagnetic process, it is possible that strong electromagnetic fields may affect the system adversely.
Common sources of interference are fluctuating loads on nearby high-voltage lines, heavy duty transformers, transmitting equipment, and air conditioners.

It is recommended that the equipment be used in an environment where the surrounding temperature does not exceed limits of 40° to 104°F (5° to 40°C), with the relative humidity between 20 and 80%.
Allow at least a 4 inch (approx. 10 cm) clearance behind the rear-panel.

2-3 DIMENSIONS

Dimensions of the MX-5050 MK Ⅲ-8 are shown in Figure 2-1.

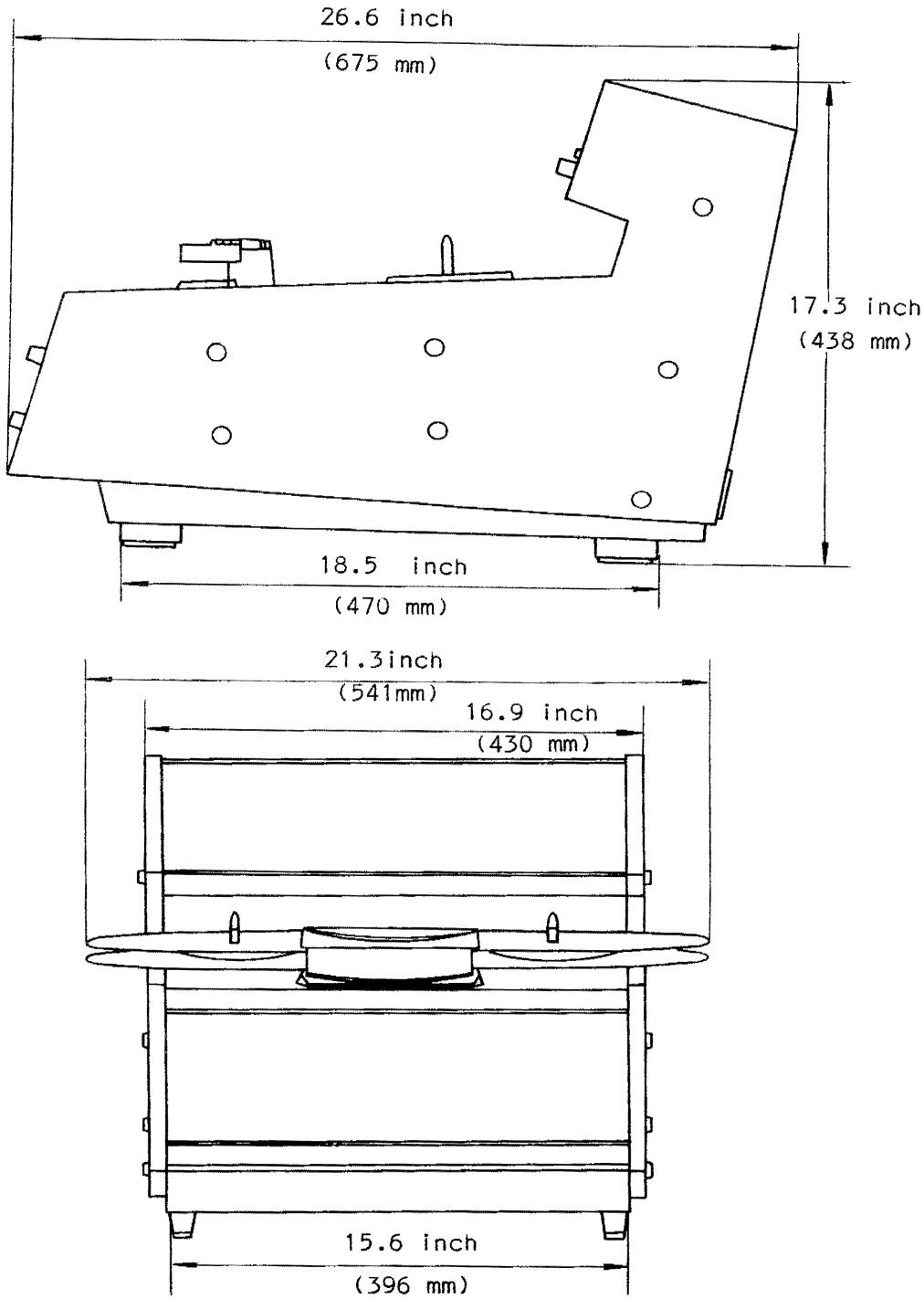


Figure 2-1 Dimensions

2-4 STANDARD SWITCH POSITION ON SHIPMENT

LINE INPUT LEVEL and OUTPUT LEVEL switches are provided on the adjusting panel in the record/reproduce electronics and the STAND-BY switch is provided on the rear panel of the electronics on the MX-5050 MKⅢ -8.

These switches have been set at the factory at one of two positions as shown in Table 2-1.

Slide the switch to the desired position to change the standard.

Table 2-1 Standard Switch Position on shipment

SWITCH	Ref. No	POSITION
LINE INPUT LEVEL	1	L (minimum -18 dBm)
LINE OUTPUT LEVEL	2	H (+4 dBm)
STAND-BY	3	OFF

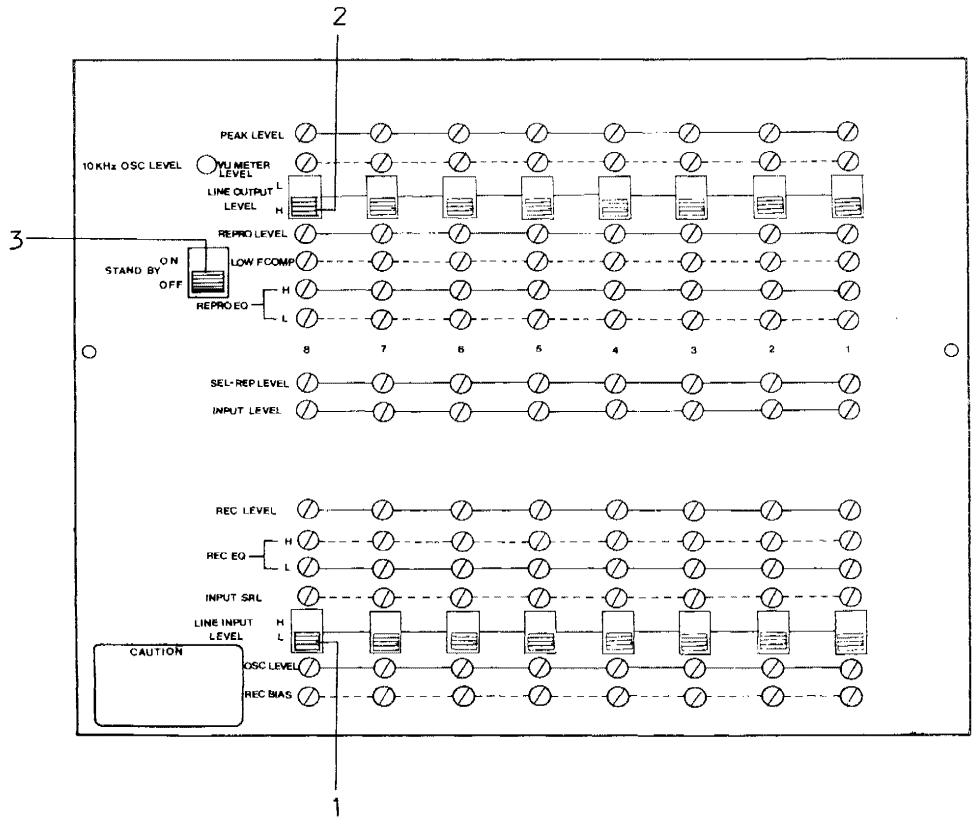
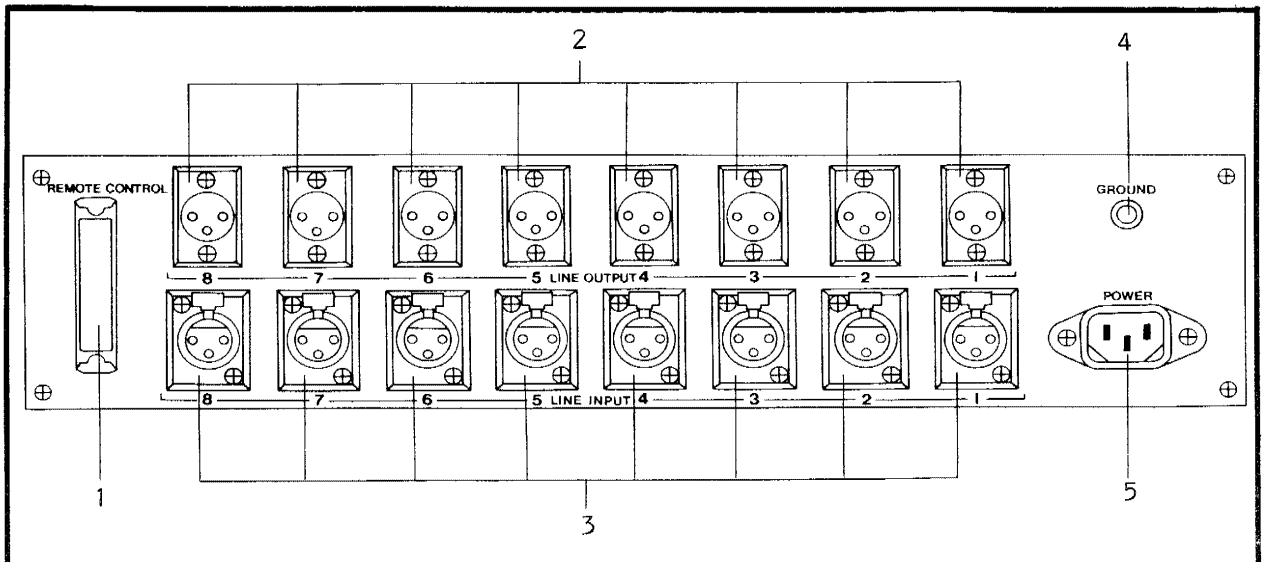


Figure 2-2 Rear Panel

2-5 POWER AND SIGNAL CONNECTION

Power, auxiliary ground, remote, and line input/output connections are made on the rear connector panel of the MX-5050 MKⅢ-8.
Table 2-2 shows the function of each connector and component on the rear panel.

Table 2-2 Rear Connector Panel



Index No.	Name	Function
1	REMOTE CONTROL connector	Used to connect optional remote control unit (CB-110 or CB-114)
2	LINE OUTPUT connectors	Male XLR connector with un-balanced output. Load impedance : 600 ohm or greater Level : +4 or -8 dBm at 0 VU, selectable with on-board switch. Maximum output level: +21 dBm with a 600 ohm load.
3	LINE INPUT connectors	Female XLR connector with un-balanced input. Input impedance : 50 kohm Minimum input :-6 dBm or -18 dBm, selectable with on-board switch.

4	GROUND terminal	Auxiliary ground connection for use with equipment not connected to a common ac ground.
5	POWER connector	Three-terminal connector for connection to ac power and ground.

On the front of the bottom frame.

PRODUCTION nameplate	Indicates model number, production lot number (serial number), power requirements, and place of manufacture.

On the rear panel.

CAUTION	Precautions for preventing fire and shock.

2-5-(1) AC POWER CONNECTION

The MX-5050 MKⅢ-8 is factory set to operate at the line voltage and frequency indicated on the packing case and on the front of the bottom frame.

AC power is connected by means of a three-wire power cable which also provides a common ground connection.

If a two-wire receptacle is used with an adaptor, be sure the adaptor is properly grounded.

If a change of line voltage is desired to accommodate different power requirements, please contact your nearest Otari dealer.

2-5-(2) SIGNAL CONNECTIONS

Line input (female) and line output (male) connectors are XLR-type connectors.
To wire the mating plugs, refer to Figure 2-3 and proceed as follows.

LINE INPUT CONNECTOR WIRING:

For unbalanced inputs using two-conductor shielded cable, wire the male XLR-connector as follows:

1. Connect the signal leads of a cable to pin 3 (high) and pin 2 (low) of the connector.
2. Connect the cable shield to pin 1 of the connector.
3. Connect a jumper from pin 1 to pin 2 of the connector.

For unbalanced inputs using single-conductor shielded cable, wire the male XLR-connector as follows:

1. Connect the center conductor of the single-conductor shielded cable to pin 3 of the connector.
2. Connect the cable shield to pins 1 and 2.

LINE OUTPUT CONNECTOR WIRING

For unbalanced outputs using two-conductor shielded cable, wire the female XLR-connector as follows:

1. Connect the signal leads of the cable to pin 3 (high) and pin 2 (low) of the connector.
2. Connect the cable shield to pin 1 of the connector.
3. Connect a jumper from pin 1 to pin 2 of the connector.

For unbalanced outputs using single-conductor shielded cable, wire the female XLR-type connector as follows:

1. Connect the center conductor cable to pin 3 of the connector.
2. Connect the cable shield to pin 2 of the connector.
3. Connect a jumper between pins 1 and 2 of the connector.

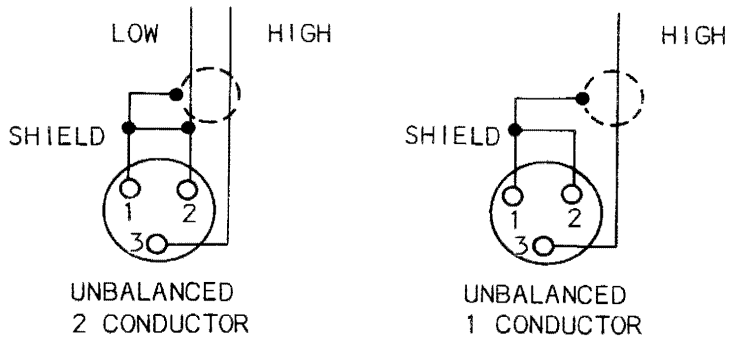


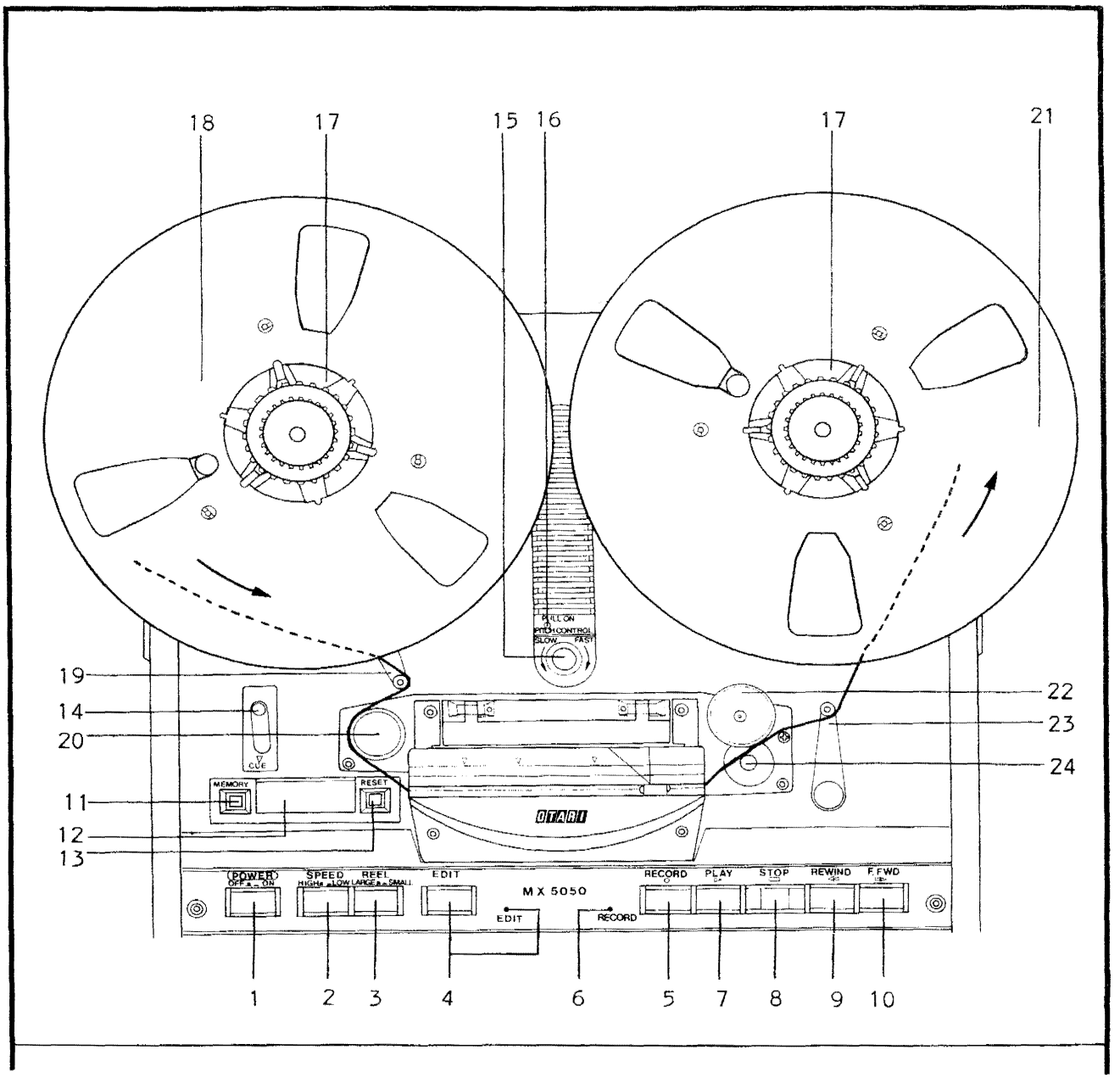
Figure 2-3 Input/Output Assembly Connector Wiring

SECTION 3
OPERATION

This section of the manual provides a description of all operating controls and indicators and their use in the system, and step-by-step procedures for the various modes of operation.

3-1 CONTROLS AND INDICATORS

Table 3-1 Tape Transport Controls and Indicators



Index No.	Name	Function
1	POWER pushbutton switch	In the depressed position, power is applied to the equipment, and the VU meters illuminate.
2	HIGH/LOW SPEED pushbutton switch	An alternate-action pushbutton switch used to select operating speed. In the HIGH position for 15 ips (38cm/sec) operation, and in the LOW position for 7 1/2 ips (19cm/sec) operation.
3	LARGE/SMALL REEL pushbutton switch	An alternate-action pushbutton switch used to select both reel tensions for the reel hubs diameter. In the LARGE position for reels with NAB hubs (4 1/2 in. diameter hubs), and in the SMALL position for reels with small hubs. *The same size reels should be used on both reel tables.*
4	EDIT pushbutton switch and EDIT indicator (green)	Used to initiate the EDIT mode to aid in cutting out unwanted tape. When the EDIT pushbutton is depressed, the green EDIT indicator illuminates and the power is removed from the takeup reel. Then the PLAY pushbutton is depressed, causing the supply reel to rotate and the tape to be spilled off from the takeup side of the transport. Other operations are halted.

Index No.	Name	Function
5	RECORD pushbutton switch (momentary) (Remote-controllable switch)	Used in conjunction with the PLAY pushbutton on the transport and the READY/SAFE toggle switches on the Amplifier control panel. Selecting READY position on desired channel, simultaneous pressing of PLAY and RECORD pushbuttons initiates RECORD mode and RECORD indicator on the transport illuminates. In the PLAY mode, when the RECORD pushbutton is pushed, this unit enters into the RECORD mode. (This is called "Punch in".) In the RECORD mode, when the PLAY pushbutton is depressed, the unit enters into the PLAY mode. (This is called "Punch out".) "Punch in" and "Punch out" are used for overdubbing in conjunction with the SEL/REP function.

<table>
<tr><th>Index No.</th><th>Name</th><th>Function</th></tr>
<tr><td>6</td><td>RECORD indicator (red) (also located on Remote control)</td><td>Indicates the RECORD mode.
<table>
<tr><th>Transport</th><th>Amplifier</th><th>Transport RECORD indicator</th><th>Amplifier RECORD indicator</th><th>Recording</th></tr>
<tr><td>non RECORD mode</td><td>SAFE</td><td>dark</td><td>dark</td><td>×</td></tr>
<tr><td>non RECORD mode</td><td>READY</td><td>blinking</td><td>blinking</td><td>× ready</td></tr>
<tr><td>RECORD mode</td><td>SAFE</td><td>lights</td><td>dark</td><td>×</td></tr>
<tr><td>RECORD mode</td><td>READY</td><td>lights</td><td>lights</td><td>○</td></tr>
</table>
Blinking indicators means that the amplifier is in the RECORD-READY mode. Recording is being carried out only when the amplifier and transport RECORD indicators remain lit.</td></tr>
<tr><td>7</td><td>PLAY pushbutton switch (momentary) (Remote-controllable switch)</td><td>Used to select the PLAY mode, or used in conjunction with the RECORD pushbutton to perform "Punch in" and "Punch out".
Pressing the PLAY pushbutton during the F.FWD or REWIND mode stops the tape motion, then automatically starts the PLAY mode.</td></tr>
</table>

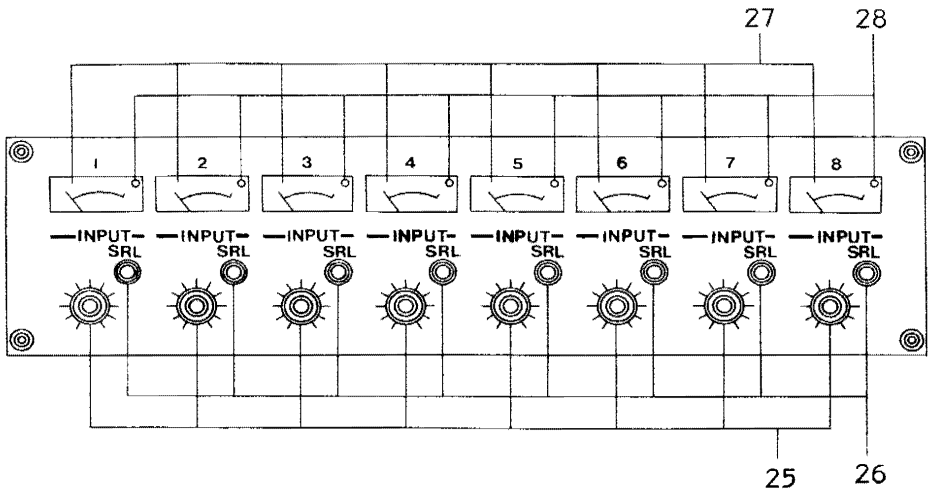
Index No.	Name	Function
8	STOP pushbutton switch (momentary) (Remote-controllable switch)	Used to stop the tape motion, cancelling the existing mode of operation.
9	REWIND pushbutton switch (momentary) (Remote-controllable switch)	Used to select the REWIND mode to wind the tape from right to left at high speed. This mode can be entered from any mode except EDIT.
10	F.FWD (FAST FORWARD) pushbutton switch (momentary) (Remote-controllable switch)	Used to select the F.FWD mode to wind the tape from left to right at high speed. This mode can be entered from any mode except EDIT.
11	MEMORY pushbutton switch (momentary) (Remote-controllable switch)	Used to stop the tape at the "00:00:00" position. This mode can be entered from any mode except both EDIT and RECORD.
12	Tape Timer (7-segment LED) (also located on Remote control)	A 6-digit TIMER used to locate or log program material on the tape. The first two digits indicate sign and hour; the second two digits indicate minutes; and the last two digits indicate seconds.
13	RESET pushbutton switch (Remote-controllable switch)	Used to reset the figure of the Tape Timer to "00:00:00".

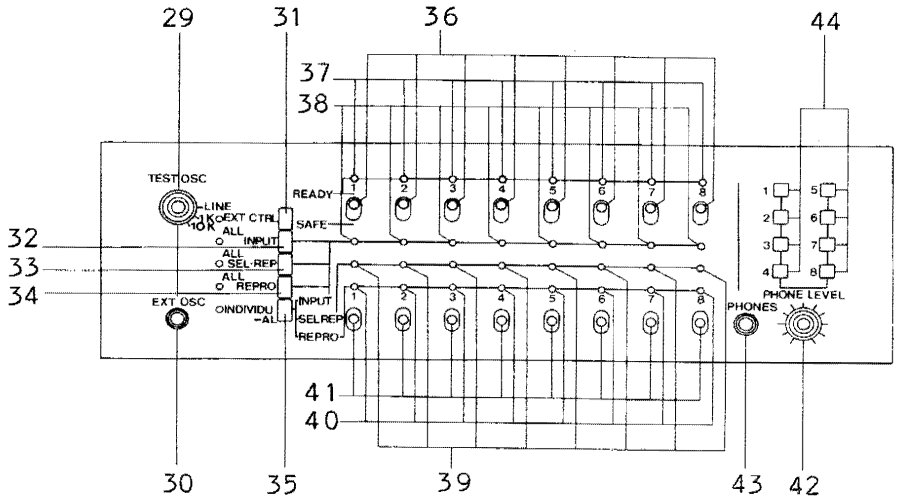
Index No.	Name	Function
14	CUE lever	Used to carry out audio monitoring in the F.FWD and REWIND modes. To lock the lever, shift the lever to the full down position.
15	PITCH CONTROL	Used to control tape speed. The capstan speed can be controlled within ±7% of nominal speed when the PITCH CONTROL knob is pulled out. (variable mode) Turning clockwise causes the capstan speed to increase and turning counter-clockwise, causes the capstan speed to decrease. *PITCH CONTROL functions in both the RECORD and PLAY modes.*
16	PITCH CONTROL indicator (red)	Illuminates when the PITCH CONTROL knob is pulled out. (In variable mode).
17	NAB Hub Reel Hold Down Knobs	Used to attach NAB hub reels to the reel table. (Refer to 3-3-(1))
18	Supply Reel	Supplies tape for reproduction or recording.
19	Tension Arm	Damps tape tension fluctuations.
20	Impedance roller	Reduces wow and flutter.

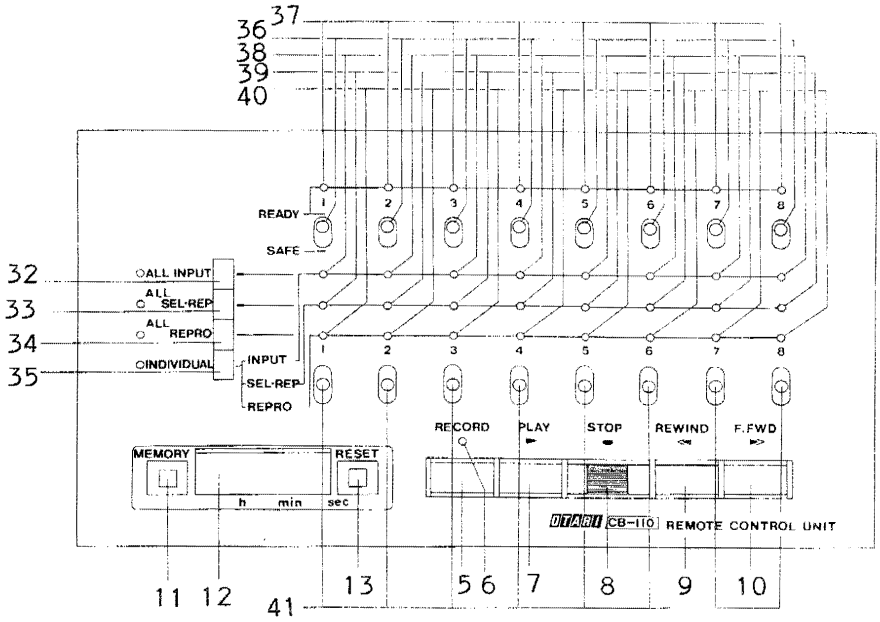
Index No.	Name	Function
21	Takeup reel	Takes up tape.
22	Pinch roller	Correctly transmits the tape with the capstan.
23	Tension Arm with Safety switch	Damps tape tension fluctuations. When tape is exhausted, supply and takeup reel rotation is automatically stopped by the safety switch attached to the tension arm.
24	Capstan shaft	Keeps the tape speed constant in the reproduce and record modes.

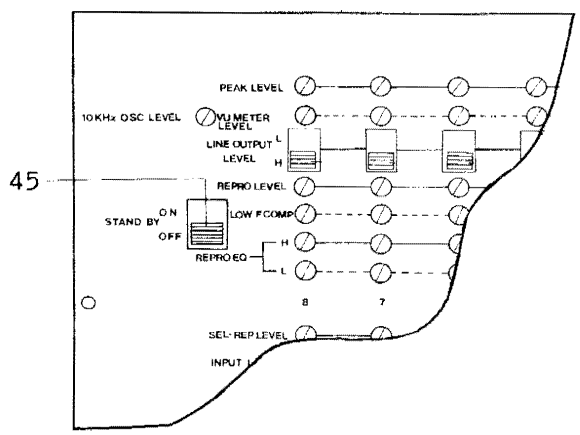
Table 3-2 shows the location and function of each control and indicator on the record/reproduce electronics and optional Remote control unit. (CB-110)

Table 3-2 Record/Reproduce Electronics Controls and Indicators




29
31
36
44
37
38
TEST OSC
LINE
1K
10K
EXT CTRL
ALL
INPUT
SAFE
READY
32
ALL
SEL-REP
33
ALL
REPRO
34
EXT OSC
INDIVIDU
ALL
INPUT
SEL-REP
REPRO
PHONES
PHONE LEVEL
41
40
30
35
39
43
42


36
37
38
39
40
READY
SAFE
32
ALL INPUT
ALL
SEL-REP
33
ALL
REPRO
34
INDIVIDUAL
35
INPUT
SEL-REP
REPRO
RECORD
PLAY
STOP
REWIND
F.FWD
MEMORY
RESET
h
min
sec
ATARI CB-110 REMOTE CONTROL UNIT
11
12
41
13
5
6
7
8
9
10


PEAK LEVEL
10KHz OSC LEVEL
VU METER LEVEL
LINE OUTPUT LEVEL
L
H
45
REPRO LEVEL
STAND BY
ON
OFF
LOW F COMP
REPRO EQ
H
L
8
7
SEL-REP LEVEL
INPUT

Index No.	Name	Function
25	INPUT level controls	Controls recording level of line of the associated channel.
26	SRL (STANDARD REFERENCE LEVEL) pushbutton switches	By pushing the pushbutton, SRL mode is entered. In SRL mode, INPUT level is of internally preset level. When inputting reference input level, the VU meter indicates 0 VU while rated output level is output at LINE OUTPUT. When the switch is out (Manual mode), INPUT level is controlled with the INPUT level controls. (Index No. 25 in this table)
27	VU meters	Indicate the record and playback level of the associated channel depending on the mode of operation and position of the monitor select switches. (Index Nos. 32,33,34,35 in this table.) The meters illuminate when the recorder is turned on.
28	PEAK indicators	Indicate signal peaks. When the input or output signal exceeds AMPEX operating level (185 nWb/m) by 15 dB (1,040 nWb/m), the PEAK indicator lights. Trigger level may be adjusted. Factory set level is 12.4 dB (NAB) or 11.2 dB (IEC) over 0 VU.

Index No.	Name	Function
29	TEST OSCillator switch	Used to select the LINE INPUT signal. The LINE position should be normally set to get the audio signal from the LINE INPUT connector for recording. The "1k" or "10k" position is set to feed a tone of 1 KHz or 10 KHz to the LINE INPUT circuit for cue tone recording or electrical adjustment. The EXT OSC position is set to feed the tone from the EXT OSC jack to the LINE INPUT circuit.
30	EXT OSCillator jack	Used to input signal from external audio oscillator. Standard single-conductor phone jack. Input impedance: 10 kohm Minimum input : -18 dBm
31	EXT CTRL (EXTERNAL CONTROL) pushbutton switch and indicator (green)	Pressing the pushbutton, the adjacent indicator lights, and the optional CB-110 Remote Control Unit can be operated. During the operation by Remote Control Unit, the actual mode of operation can be monitored on the Amplifier Control Panel irrelevant to the position of the switches on the panel.
32	ALL INPUT pushbutton switch and indicator (yellow) (Remote-controllable switch)	Pressing the pushbutton, the adjacent indicator lights, all the INPUT indicators lights, and the input signals are fed to the LINE OUTPUT connectors, the PHONES jack, the VU meters, and the PEAK indicators of all channels.

Index No.	Name	Function
33	ALL SEL/REP (SELECTIVE REPRODUCTION) pushbutton switch and indicator (green) (Remote-controllable switch)	Pressing the pushbutton, the adjacent indicator lights, all the SEL/REP indicators lights, and the programs via the record head are fed to the LINE OUTPUT connectors, the PHONES jack, the VU meters, and the PEAK indicators of all channels. Entering the RECORD mode, the monitor program on READY (Index No.36 in this table) selected channels are automatically switched from SEL/REP to INPUT. This function is for "Punch in" and "Punch out".
34	ALL REPROduce pushbutton switch and indicator (orange) (Remote-controllable switch)	Pressing the pushbutton, the adjacent indicator lights, all the REPRO indicators lights, and the programs via the reproduce head are fed to the LINE OUTPUT connectors, the PHONES jack, the VU meters, and the PEAK indicators of all channels.
35	INDIVIDUAL pushbutton switch and indicator (green) (Remote-controllable switch)	In the depressed position, the adjacent indicator lights, and INPUT or SEL/REP or REPRO mode can be selected with the Monitor Select toggle switches (Index No. 41 in this table) at the individual channel.

Index No.	Name	Function
36	READY/SAFE toggle switches (Remote-Controllable switch)	Used to select channels for recording in conjunction with the PLAY and RECORD pushbuttons on the transport. Selecting the READY position, the RECORD indicators illuminate or blink and the RECORD mode of associated channels may be entered or ready. Selecting the SAFE position, the RECORD indicators turn off and activation of associated channels RECORD mode are cancelled. (Index Nos. 5,6,7 in this table.)
37	RECORD indicators (red)	Indicate the record mode of associated channel by lighting up.
38	INPUT indicators (yellow)	Indicate activation of associated channel INPUT mode. (Index Nos.32,35 in this table)
39	SEL/REP indicators (green)	Indicate activation of associated channel SEL/REP mode. (Index Nos.33,35 in this table)
40	REPROduce indicators (orange)	Indicate activation of associated channel REPRO mode. (Index Nos.34,35 in this table)
41	Monitor Select toggle switches (Remote-controllable switch)	Used to select the monitor program. (LINE OUTPUT signal)

Index No.	Name	Function
42	PHONE LEVEL control	Used to control all channel PHONE LEVELs with interlocking.
43	PHONES jack	Used to monitor the INPUT or the recorded program. Standard two-conductor phone jack, available for both Stereo and Monaural headphones, used to monitor the output signal selected by MONITOR SELECT push-button switches. Load impedance : 8 ohm or greater Output level: -19 dBm with an 8 ohm load
44	PHONE SELECT pushbutton switches	Alternate-action pushbutton switches used to select the channel to be monitored. All channels can be mixed.
45	STAND-BY slide switch	In "ON" position, entering the STOP or F.FWD or RWD mode, the monitor program on READY selected channels are automatically switched to INPUT.

3-2 CB-110 REMOTE CONTROL UNIT OPERATION (OPTION)

The OTARI CB-110 Remote Control Unit is designed specifically for the MX-5050 MKⅢ-8.
The CB-110 takes over full function (transport control; memory function; tape timer; audio electronics control) of MX-5050 MKⅢ-8.
Connect the connector of the CB-110 to the connector of MX-5050 MKⅢ-8 located on the rear panel.

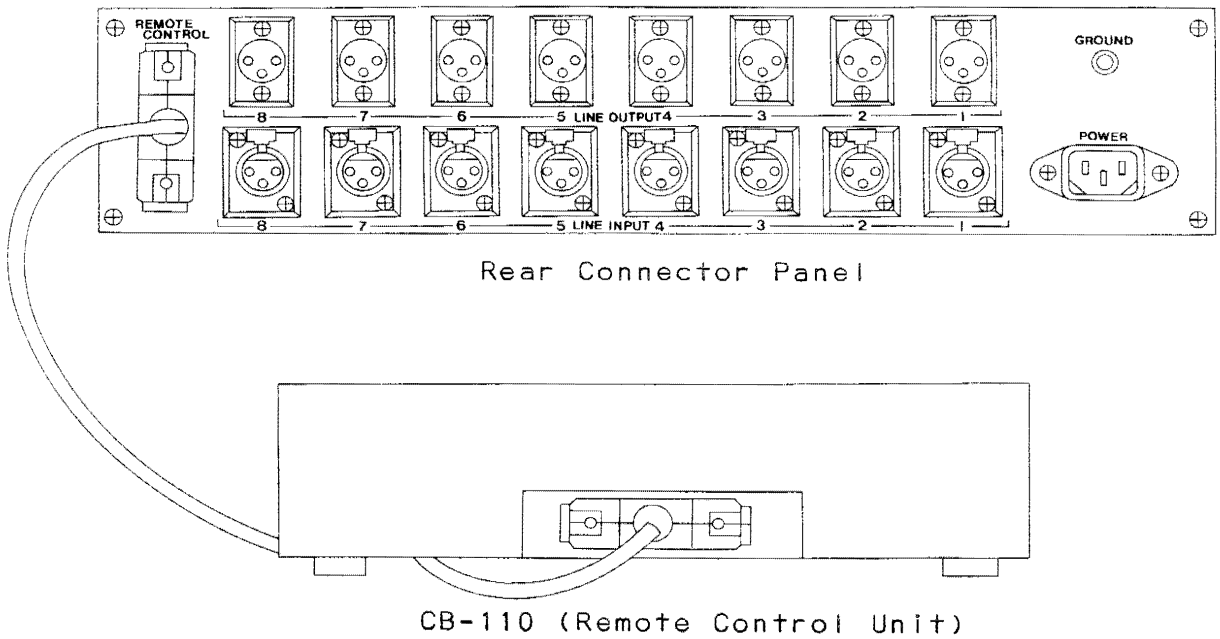


Figure 3-1 Connection of Remote Control Unit

3-3 OPERATING INFORMATION

3-3-(1) USING THE REEL HOLD DOWN KNOBS

The NAB hub reel hold down knobs shown in Figure 3-2 are used to attach the NAB hub tape reel on to the reel table, proceed as follows:

For the NAB hub (4 1/2 inch diameter hub) tape reel;

(1) Place the reel hold down knob on the reel table and turn the inner knob clockwise to lock the reel hold down knob to the reel shaft.

(2) Place the NAB hub tape reel onto the reel table so that the three slots of the tape reel correspond to the three notches of the base of the reel hold down knob.
Pulling and turn the outer knob 60° to fix the tape reel.

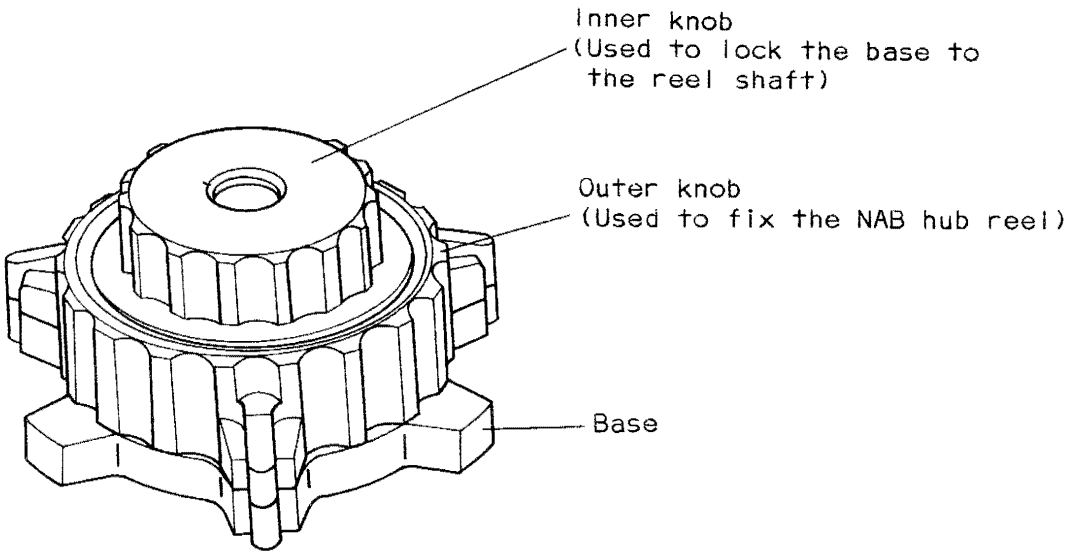


Figure 3-2 Reel Hold Down Knob

3-3-(2) PRE-OPERATING PROCEDURE

After the equipment has been installed as described in Section 2 of this manual and the operator has become familiar with all the operating controls and indicators described in Tables 3-1 and 3-2, prepare the recorder for operation as follows.

(1) Press the POWER switch to the "IN" ON position.
The VU meters light up and the Tape Timer illuminates.

(2) Place a reel of tape on the supply (left-hand) reel table as described in Section 3-3-(1).
If metal reels are used, use reel-adjusting discs (shims) between the tape reels and the reel tables.
Note that the reel must turn counterclockwise as tape is pulled off the reel.

(3) Place the same size empty reel on the takeup (right-hand) reel table as described in Section 3-3-(1).
Note that the same size reels should be used on both reel tables.

(4) Thread the tape as shown in Figure 3-3 and place the end of the tape in the slot of the empty reel, and rotate the reel several times with holding the tape end and removing slack tape.

(5) Set the HIGH/LOW SPEED switch to the desired tape speed.

(6) Set the LARGE/SMALL REEL switch to correspond to the size of the reel hub diameter being used.

(7) If desired, connect a headset or monitor speaker/ amplifier to the PHONES jack.

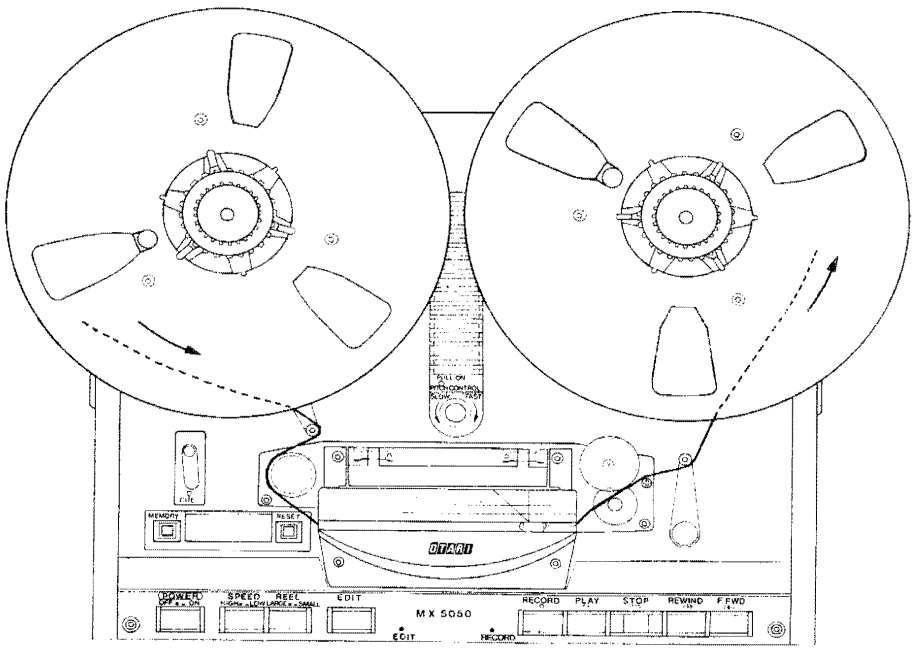


Figure 3-3 Tape Threading

3-3-(3) REPRODUCTION

To reproduce, proceed as follows:

(1) Perform all steps in the pre-operating procedure.

(2) Set the all channel READY/SAFE toggle switches to the "OUT" SAFE position to avoid mis-erasing of the recorded tape program.

(3) After pushing the INDIVIDUAL pushbutton switch, set the desired MONITOR SELECT toggle switch(es) to the "REPRO" position for the channel(s) reproduced. (When reproduction of all channels are made, push the ALL REPRO pushbutton switch.)

(4) Depress the PLAY pushbutton to start tape monitoring.

(5) To stop the reproduction of the tape program, depress the STOP pushbutton at a desired position.

3-3-(4) NORMAL RECORDING

To record normally, proceed as follows:

(1) Perform all steps in the pre-operating procedure.

(2) After pushing the INDIVIDUAL pushbutton switch, set the desired READY/SAFE toggle switch(es) to the "READY" position for the channel(s) selected for recording.
The associated channel red RECORD indicator(s) and transport RECORD indicator will start blinking.
In case of all channel recording, after pushing all INPUT pushbutton switches, set all READY/SAFE toggle switches to the "READY" position.
All channel RECORD indicators and transport RECORD indicator will start blinking.

(3) Set the desired MONITOR SELECT toggle switches of associated channels to the "INPUT" position. (This step is skipped for all channel recording.)

(4) Adjust the desired LINE INPUT level control(s) so that the VU meter(s) indicates 0 VU at the most audio peaks.
(It is advisable to adjust the channel input levels so that the peak indicator LEDs, located in the VU meter housings, blink occasionally.)

(5) Reset the Tape Timer to "00:00:00".

(6) Press the PLAY and RECORD pushbutton of the transport simultaneously to start recording.
The red RECORD indicator of the selected channel(s) and transport remain lit.
During the play mode, press the RECORD pushbutton to enter directly into the record mode without stopping the tape transport.
(This is called "Punch in".)

(7) While recording, the input signal(s) of each channel can be compared with the signal reproduced on each channel by setting the MONITOR SELECT toggle switches to the "REPRO" position.

(8) When recording is completed, press the STOP pushbutton to stop tape motion or press the PLAY pushbutton to enter into the PLAY mode without stopping the tape transport.
(This is called "Punch out".)

(9) To find the exact "00:00:00" position on the tape, press the MEMORY pushbutton several times.

3-3-(5) RECORDING WITH SELECTIVE REPRODUCTION

The selective reproduction function causes the reproduced program to be monitored from the record head rather than from the reproduce head.
This enables a recording to be made on anotner channel synchronized (in phase) with the channel being reproduced.
To record with selective reproduction, proceed as follows:

(1) Perform all steps in the pre-operating procedure.

(2) Perform all steps in the normal recording procedure for the channel(s) to be prerecorded.

(3) Rewind the tape to the point where selective reproduction is to start.

(4) Set the READY/SAFE toggle switches of the channel(s) selected for recording to the "READY" position.

(5) After pressing the INDIVIDUAL pushbutton switch, set the MODE SELECT toggle switch(es) for the channel(s) selected for recording to the "INPUT". (or press the All INPUT pushbutton switch.)

(6) Adjust the LINE INPUT level control so that the VU meter indicates 0 VU for most audio peaks.
(It is advisable to adjust the channel input levels so that the peak indicator LEDs, located in the VU meter housings, blink occasionally.)

(7) After pressing the INDIVIDUAL pushbutton switch, set the MODE SELECT toggle switch(es) to the "SEL/REP" position for the channel(s) selected.
(or set the All SEL/REP pushbutton switch for all channnel SEL/REP MODE)

(8) Press the PLAY pushbutton switch to start tape motion.
At the point where overdub is desired, press the RECORD pushbutton to start recording on the selected channel(s).
Simultaneously the monitor program of "READY" selected channel(s) automatically change(s) to the "INPUT".

(9) When recording is complete, press the STOP pushbutton to stop tape motion and de-activate the RECORD mode, or depress the PLAY pushbutton for punch out operation.

Note: The pitch control is available to finely adjust the tape speed of one track (pre-recorded track) with another track(s) for overdubbing, which can be used in both the Record and Reproduce modes.

3-3-(6) FAST WINDING

For fast-winding operations, and for editing or cueing, press the F.FWD or REWIND pushbutton switch as appropriate.
These pushbuttons can be pressed alternately without pressing the STOP pushbutton between fast-winding operations.
These modes may be entered into from any other mode except the EDIT mode.
Pressing the PLAY pushbutton during a fast-winding mode causes the tape to automatically come to a stop and then enter into the PLAY mode.
In a fast-winding mode, the tape lifters (shifters) are automatically actuated and lift the tape away from the heads.
To monitor the tape in a fast-winding mode, the position of the tape lifters can be varied by operation of the CUE lever.
Thus the distance of the tape from the heads may be varied to control the signal level from the tape.

3-3-(7) EDITING AND SPLICING TAPE

For editing and splicing operations, the CUE lever can be used in fast-winding modes to quickly locate the desired program material.
In addition, there is an EDIT mode of operation, used as follows:

Depressing the EDIT pushbutton while in the PLAY mode removes power from the takeup reel and causes the tape to be spilled off on the takeup side of the transport.
This mode is used to facilitate cutting out unwanted tape.
The EDIT mode can also be entered into from the STOP mode by pressing the PLAY pushbutton after the EDIT pushbutton is depressed.
The tape-splicing block (Figure 3-4) mounted on the head cover can be used to hold the tape for ease in cutting the tape with a single-edged razor blade and applying splicing tape.
Use 7/32-inch width splicing tape (3M Co.,No. 41), and never use cellophane tape.

The tape splicing block has the following features:

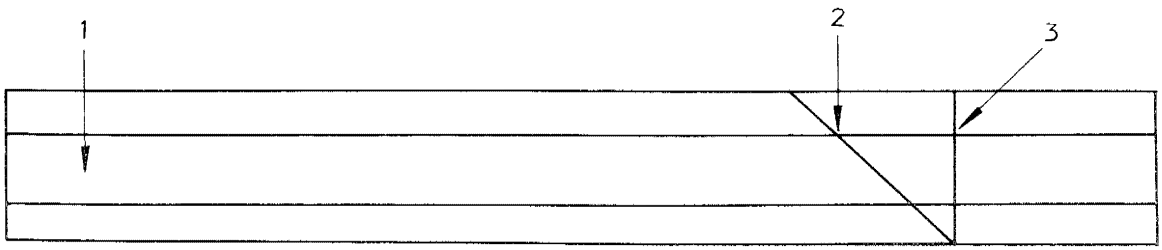


Figure 3-4 Tape splicing block

1 Tape-guide channel: Holds the tape for ease of cutting and splicing.

2 45° cutting guide: Used to guide tape cutter for a diagonal cut for splicing.

3 90° cutting guide: Used to guide tape cutter for a vertical cut.

SECTION 4
GENERAL INFORMATION OF MAINTENANCE

4-1 TEST AND MAINTENANCE EQUIPMENT REQUIREMENTS

All maintenance, electronic, and mechanical test equipment required during maintenance, alignment, and adjustment of the recorder is listed in Table 4-1 and the standard test tapes are listed in tables 4-2, and 4-3.
In addition, recommended maintenance periods are shown by accumulative hours of usage and/or elapsed period of time, whichever comes first.
Equivalent equipment can be substituted for the equipment suggested in the table.

Table 4-1 Test and Maintenance Equipment

Equipment Type	Suggested Model	Used For	Period
Head cleaner	Ampex 087-007 or 4010823	Cleaning heads and guides	8 hours
Isopropyl or denatured alcohol	Any	Cleaning capstan pinch-roller	8 hours
Q tips	Any	Cleaning heads and guides	8 hours
Head demagnetizer	Ampex 4010820	Demagnetizing heads and guides	8 hours
Lubricating oil	Anderol #456 (TENNECO)	Oiling of capstan	1,000 hours or 6 months
Spring scales 500g, 1kg, 3kg (0-16 oz, 0-32 oz, and 0-10 lbs)	Any (pushing and pulling)	Mechanical adjustment	1,000 hours or 6 months
Vacuum cleaner and brushes	Any	General cleaning	1 month
Standard alignment and flutter test tape	Refer to Table 4-2 and 4-3	Reproduce amplifier alignment and Flutter test	150 hours or 1 month

Equipment Type	Suggested Model	Used For	Period
Audio oscillator	Hewlett Packard 200CD or 204C	Overall frequency response and signal-to-noise measurement	150 hours or 1 month
Ac voltmeter (VTVM)	Hewlett Packard 400E or 400FL	Same as above	Same as above
Bandpass filter	Refer to Figure 7-1	Same as above	Same as above
Flutter meter	Meguro Electronics Corp. MK668C or MK669	Flutter and wow, tape speed measurement	150 hours or 1 month
Wave analyzer	Hewlett Packard 3581A or 339A	Distortion and crosstalk measurement	Same as above
Test cables	Refer to text		
Technicians tools			
Allen wrenches	Metric		
Volt-ohm meter	20,000 ohms/volt any brand	Test and adjustment	

Table 4-2 Flutter Test Tapes

TAPE WIDTH (INCHES)	SPEED (IN/S)	FREQUENCY (HZ)	AMPEX CATALOG NO.
1/2	7 1/2	3000	01-31326-05
1/2	15	3000	01-31316-05

Table 4-3 Reproduce Alignment Test Tape

Tape speed	Equalization	MRL *1 Catalog number	Reference level (Fluxivity)
15 ips	NAB	31J219	250 nWb/m *2
7 1/2 ips	NAB	31T218	250 nWb/m *2
15 ips	IEC	31J329	320 nWb/m *3
7 1/2 ips	IEC	31T328	320 nWb/m *3

*1 Magnetic Reference Laboratory.

*2 Short circuit flux.

*3 Open circuit flux which corresponds to 290 nWb/m of short circuit flux.

SECTION 5
ROUTINE MAINTENANCE AND CONVERSION INFORMATION

5-1 ROUTINE MAINTENANCE

It is important that routine maintenance be performed at the recommended intervals.
Exterior cleaning and demagnetization should be performed after every eight hours of operation, and the interior of the transport should be cleaned once a month.
Lubrication should be performed after 1,000 hours of operation or after 6 months, whichever comes first.

5-1-(1) CLEANING

Oxide particles from the magnetic tape tend to collect on components in the tape path and degrade the performance of the recorder.
To clean the head assembly, proceed as follows:

(1) Disconnect the power cable from the power supply.

(2) Lift the head cover as shown in Figure 5-1.

CAUTION

WHEN CLEANING THE HEADS, USE ONLY THE RECOMMENDED SOLVENT (HEAD CLEANER) TO AVOID DAMAGING THE HEADS.
KEEP THE HEAD CLEANER OFF PLASTIC FINISHES AND THE CAPSTAN PINCH ROLLER.
DO NOT USE METAL TOOLS THAT COULD SCRATCH THE HEADS.

(3) Clean each head thoroughly with a cotton-tipped applicator (Q tip) dampened with head cleaner.

(4) Use isopropyl alcohol to clean all tape-guiding components, the capstan shaft, and the capstan pinch roller.

CAUTION

1. *DO NOT USE A HEAD CLEANER ON THE CAPSTAN PINCH ROLLER, SINCE THIS WILL CAUSE DAMAGE AND TAPE SLIP.*
2. *BEFORE REMOVING THE REAR COVER, THE PLUG MUST BE DISCONNECTED FROM THE POWER SUPPLY TO AVOID AN ELECTRIC SHOCK.*

(5) Place the recorder on its side, and remove the six screws on the bottom cover.
After that, remove the four screws, and open the Control P.C. Board. (Refer to Figure 5-7)

(6) Use a vacuum cleaner and a small brush to remove all dust or contamination from the interior of the transport.
If necessary lightly moisten brush with isopropyl alcohol to clean parts.

(7) Install the bottom cover and the Control P.C. Board Ass'y.

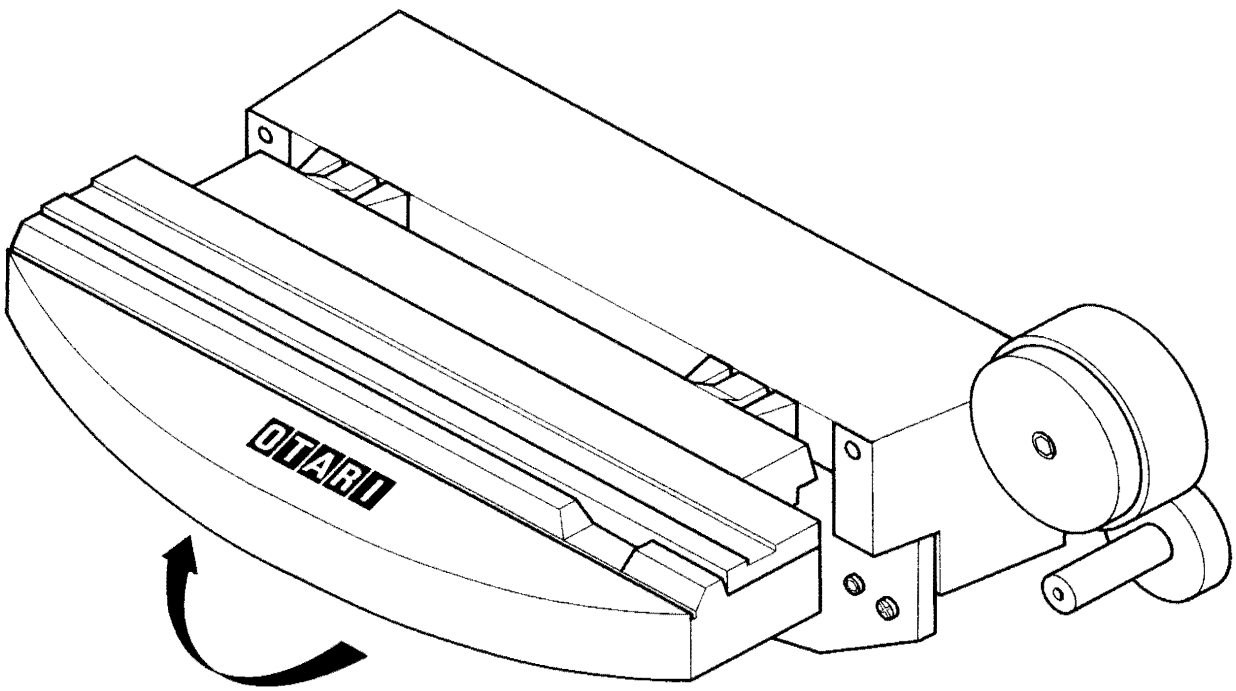


Figure 5-1 Lifting the Head Cover

5-1-(2) DEMAGNETIZING

The heads and tape guiding components in the tape path should be demagnetized after every eight hours of operation.
These components can acquire permanent magnetization that increases noise and distortion, and partially erases high frequencies on recorded tapes.
Use a hand-held head demagnetizer to demagnetize all components in the tape path as follows:

1. Turn equipment power off and move any recorded tape near the transport away (tape could be partially erased by the demagnetizer).

2. Lift the head cover as shown in Figure 5-1 .

3. Cover the demagnetizer tips with an adhesive tape to prevent scratching the head stacks.

4. With the demagnetizer at least three feet away from the transport, connect the demagnetizer to a power source.

5. Slowly move the demagnetizer tips close to the head, lightly touch the demagnetizer tips to the face of one head stack and slowly move the tips up and down at the entire face of the stack several times.
   Then slowly withdraw the demagnetizer as shown in Figure 5-2 .

6. Repeat step 5 for each head stack.

7. Repeat the motions in step 5 for each guide and other metallic parts in the tape path.

8. Slowly move the demagnetizer at least three feet away from the transport and then disconnect the power from the demagnetizer.

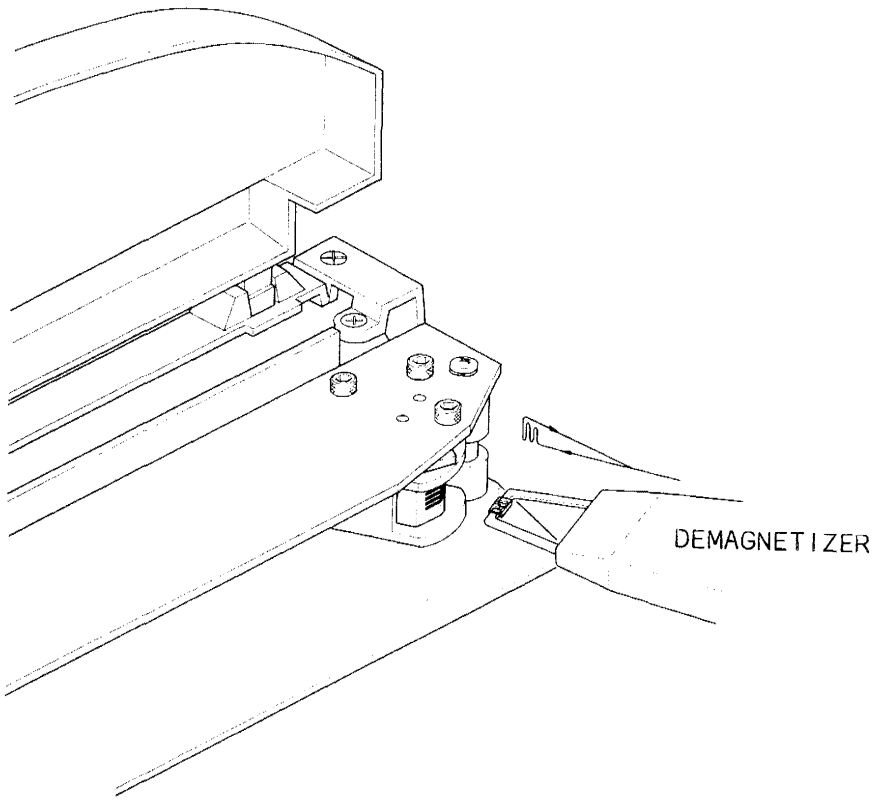


Figure 5-2 Demagnetizing

5-1-(3) LUBRICATION

The only components requiring lubrication are the capstan sleeve bearing.

Refer to Figure 5-3 and proceed as follows:

CAUTION

1. *DO NOT USE ANY OIL EXCEPT ANDEROL #456 FOR LUBRICATION.*
2. *BE CERTAIN TO CLEAN THE CAPSTAN SHAFT THOROUGHLY. LUBRICATING OIL COULD RUIN THE CAPSTAN PINCH ROLLER AND MAGNETIC TAPE. CLEAN THE CAPSTAN WITH ISOPROPYL ALCOHOL AFTER LUBRICATION.*

1. Remove the pinch roller cap by removing the screw on it.

2. Remove the pinch roller from the pinch roller shaft.

3. Remove two hex socket head screws on the head housing cover.
   Remove the head front escutcheon by removing the two screws on it and remove the head rear escutcheon by removing the three screws on it.
   Turn the Dust Cap counterclockwise and pull off from the capstan.

4. Apply 2 or 3 drops of oil to this felt collar.
   Do not over lubricate.

5. Wipe off any excess oil and install the dust cap, head front escutcheon, head rear escutcheon, and pinch roller cap in the reverse order.

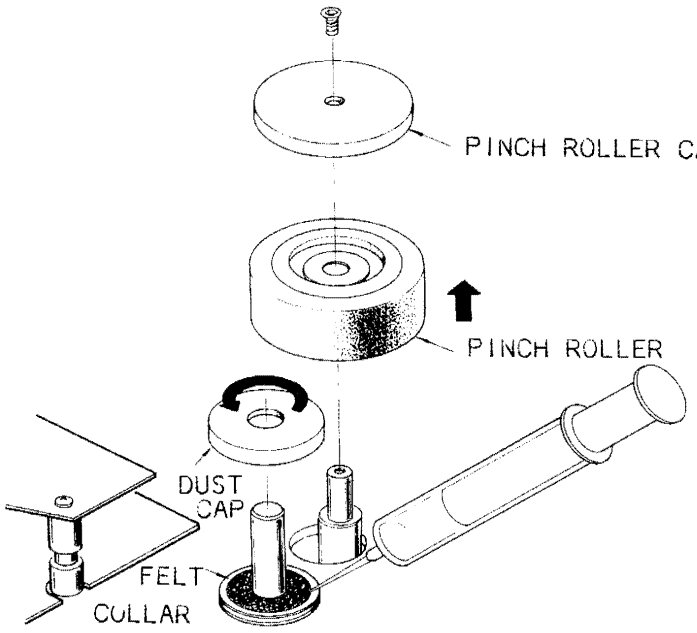


Figure 5-3 Lubrication

5-2 TAPE REPLACEMENT

The MX-5050 MKⅢ-8 is set at the factory for Scotch #226 Recording Tape.
If another tape is to be used, the following adjustment may be required for optimum tape performance.
Refer to Section 7.
Required adjustments are:

1. The record bias adjustment.
2. The record level adjustment.

5-3 EQUALIZER CHANGE

The equalizer between the NAB or the IEC can be changed by replacing the RECORD/REPRODUCE Amplifier P.C. Board Ass'y.
However, a fine equalizer adjustment and a record level set are required.
Refer to Section 7 to aid the fine adjustment.

Table 5-1 Record Level

Reference fluxivity	Relative level	Test Tape	Recording tape to be used
185 nWb/m*	0 dB	Ampex Operating level	Scotch 177, Ampex 641
250 nWb/m*	+2.6 dB	MRL NAB standard	Scotch 206,207,226,250 Ampex 406,407,456
320 nWb/m**	+3.8 dB	BASF or MRL IEC Standard	IEC Equalization

* Short circuit flux.

** Open circuit flux.

5-4 LINE VOLTAGE CONVERSION

The line voltage is converted by resoldering the wiring on the voltage selection terminal, proceed as follows:

1. Remove seven hex socket head screws putting left side board, that is supply reel side.
   By looking at inside of transport from left side, it is easy to find the voltage selection terminal on the supply reel ass'y. (Refer to Figure 5-4)

2. Resolder the lead wire of the voltage selection terminal located on the supply reel ass'y to the desired voltage terminal marked as shown in Figure 5-4.

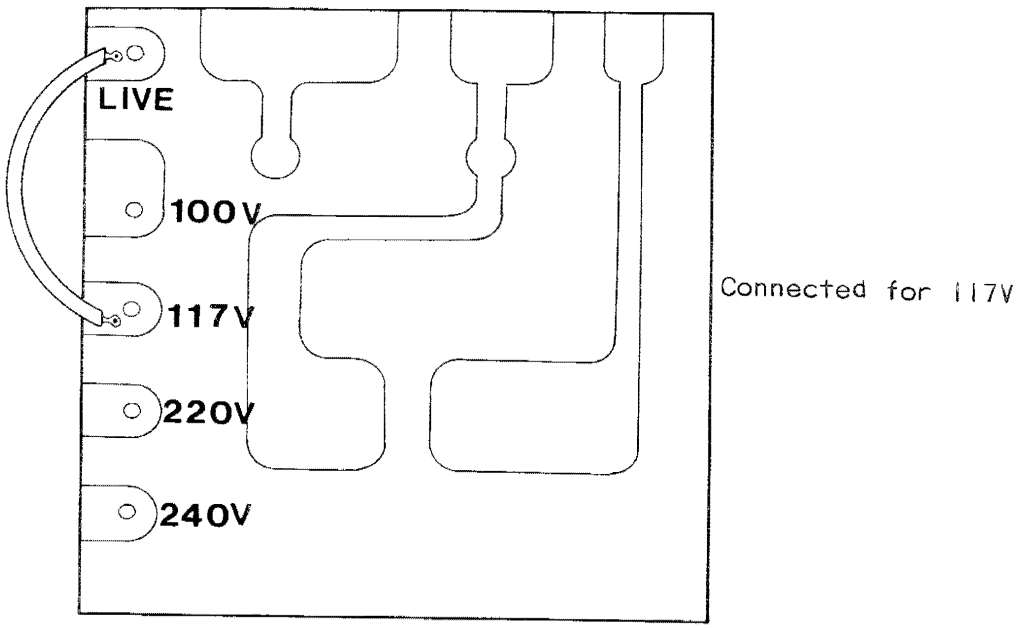


Figure 5-4 Voltage Selection Terminal

5-5 FUSE REPLACEMENT

If a fuse is blown, it is important that the possible cause is checked before replacing the fuse.

CAUTION

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE OF FUSE.

BEFORE REPLACING THE FUSE, REMOVE THE POWER CORD FROM THE POWER SOURCE.

Information concerning the seven fuses can be found in Table 5-2. For the main power fuse (FS801), proceed as follows:

1. Remove the board on the left side by removing seven hex socket head screws.

2. Replace the main power fuse (FS801) on the power switch P.C. Board.

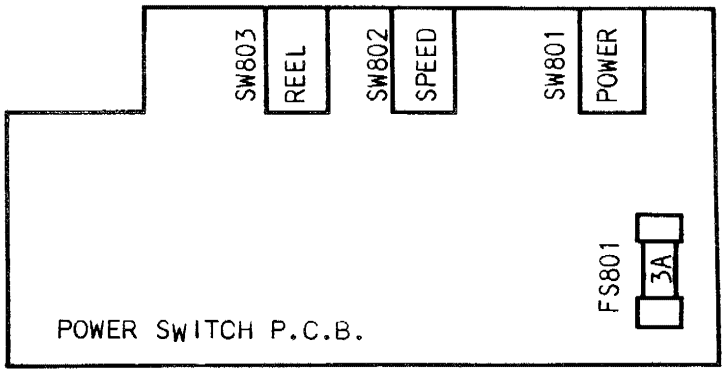


Figure 5-5 Main Power Fuse Location

For other fuses (F1 ∿ F6), proceed as follows:

1. Place the recorder on its side, and remove the six cross-recessed screws on the bottom cover.

2. Remove four cross-recessed screws marked "OPEN" on the Control P.C. Board.

3. Pull the Control P.C. Board down, and replace the blown fuse.

Table 5-2 Fuse Information

Reference number	Current	Rating				Atari part number	Used for
		voltage	size(inch,mm)	carry	blow		
FS801	3A	250V	1/4x1 1/4 inch 6.3x32mm	110%	135% in 1 hour	FH7E030	Primary Circuit
F1	2A	"	13/64x45/65 inch 5x20mm	"	" " "	FH7F020	VU Meter Lamps
F2	"	"	" " " " " "	"	" " "	"	DC Servo Cap. Motor Driver
F3	"	"	" " " " " "	"	" " "	"	Pincn roller Solenoid, Relays, and DC Servo Cap. Motor Control
F4	3A	"	" " " " " "	"	" " "	FH7F030	±15V Amplifier
F5	"	"	" " " " " "	"	" " "	"	"
F6	5A	"	" " " " " "	"	" " "	FH7F050	Brake Solenoids, +5V Transport Control LEDs

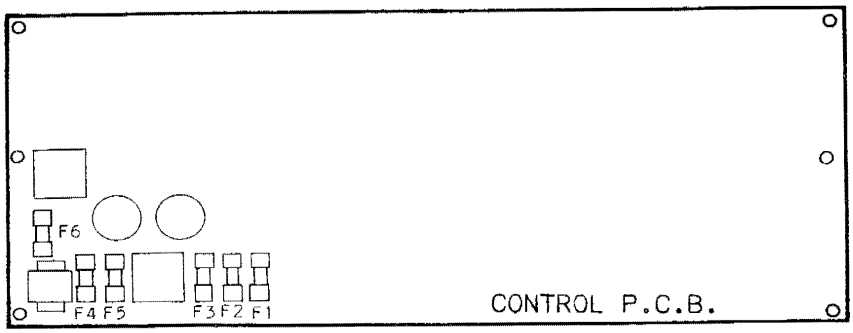


Figure 5-6 Internal Fuse Location

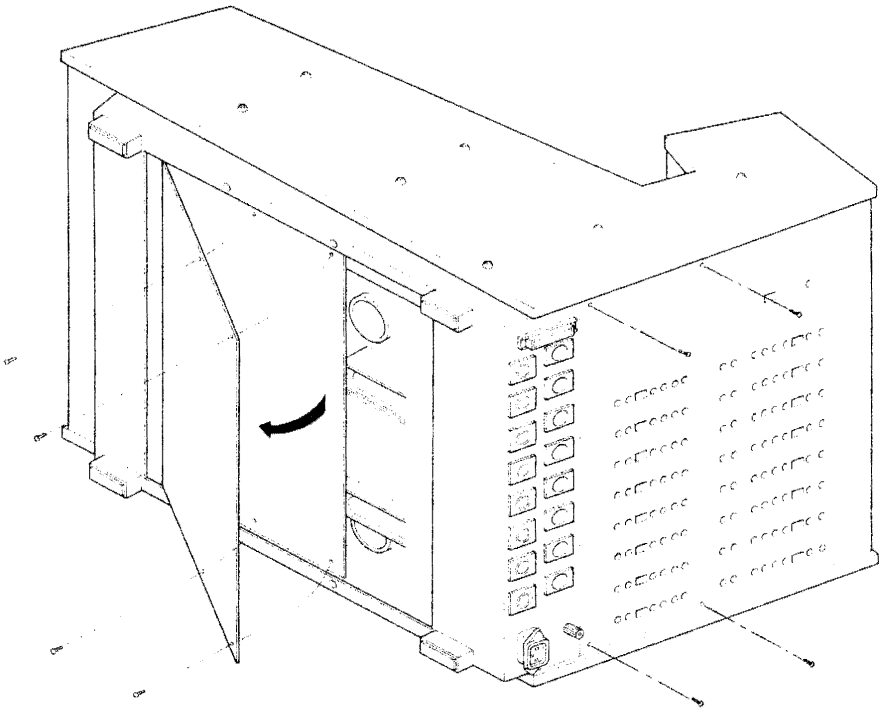


Figure 5-7 Rotating Control P.C.B.

SECTION 6
TAPE TRANSPORT MAINTENANCE

Tape transport maintenance includes procedures for adjusting the supply and takeup reel brakes, the capstan pinch roller pressure and the tape speed adjustment.

6-1 TRANSPORT ACCESS

To gain access to the recorder transport, proceed as follows:

1. Disconnect the power cable.
2. Remove two side boards by removing seven hex socket head screws.
3. Place the recorder on its side.
   Remove six cross-recessed screws on the bottom cover.
4. Open the Control P.C. Board by removing four cross-recessed screws marked "OPEN".

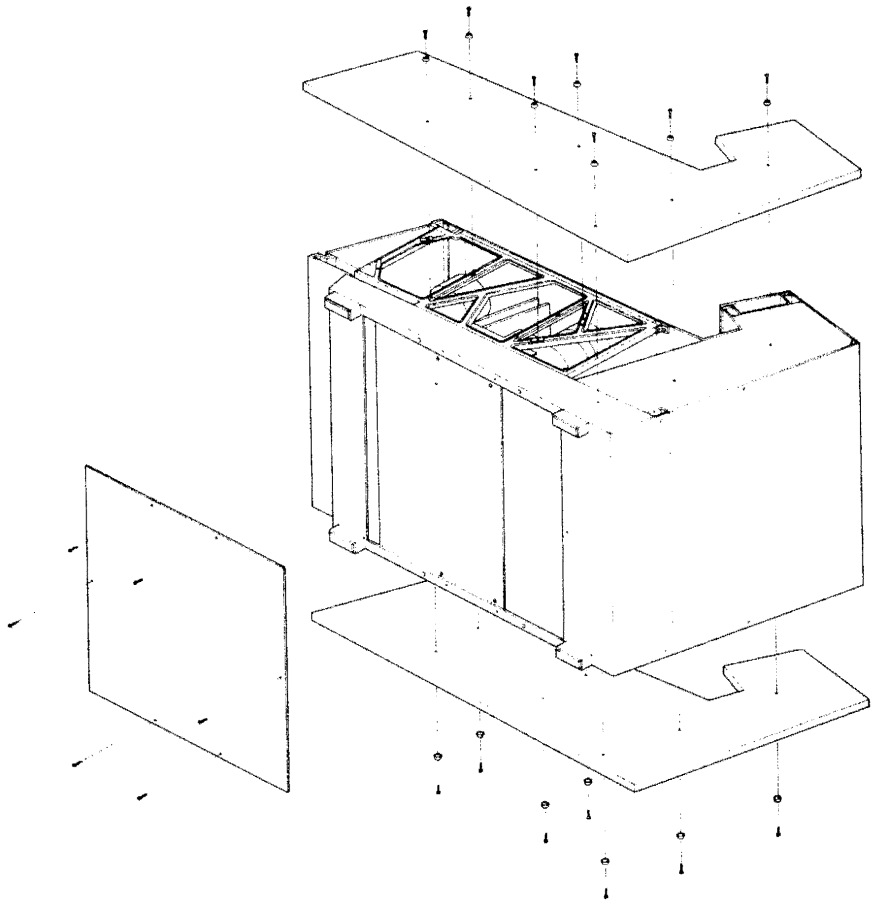


Figure 6-1 Tape Transport Access

6-2 BRAKE ADJUSTMENT

The brake system on each reel stops the rotation of the reel when power is removed.
The brakes are checked and adjusted with the power removed.
Since the brake force is different for each direction of rotation (brake differential), and there is but a single adjustment, the force is checked and adjusted for the best compromise force in each direction.
In the following steps, an empty 10 1/2 inch diameter NAB reel (4 1/2 inch diameter hub) is used and a length of cord or twine is wrapped on the hub.
A spring scale is attached to a small loop formed at the free end of the cord or twine.
Refer to Table 6-1 for the braking force specifications.
Proceed as follows:

1. Place an empty 10 1/2 inch diameter NAB reel on the supply reel table.
   Secure with a hold down knob.

2. Wind a length of cord or twine a few turns counterclockwise on the hub.
   Tie a loop at the free end of the cord or twine.

3. Insert the hook of a 500g (0-16 ounce) spring scale through the loop and hold the spring scale upright as shown in Figure 6-2.

4. Pull on the scale slowly to make the reel rotate counterclockwise (direction "B" in Figure 6-2).
   While being sure the cord does not rub against either flange, note the scale reading.
   The reading should meet the value listed on Table 6-1.

5. Wind the cord or twine in a clockwise direction on the supply reel.

6. Repeat steps 3 and 4 to make the reel rotate clockwise (direction "A" in Figure 6-2).
   The reading should meet the value listed in Table 6-1.

7. If the readings were low in both directions, remove the brake spring (shown in Figure 6-3) from the existing anchor hole on the brake lever and install the spring in the next hole located farther away from the brake solenoid.

8. If the readings were high in both directions, move the spring anchor point closer to the brake solenoid.

9. If the brake spring was moved, repeat steps 2 through 6 to check the results.

10. Repeat the brake adjustment procedure on the takeup reel.
    Note that a high braking force is present when the takeup reel is rotated clockwise.
    The braking force specifications are the same as for the supply reel.

Table 6-1 Braking Force Specifications

A	145 to 175 grams (5.1 to 6.2 ounces)
B	315 to 385 grams (11.1 to 13.6 ounces)

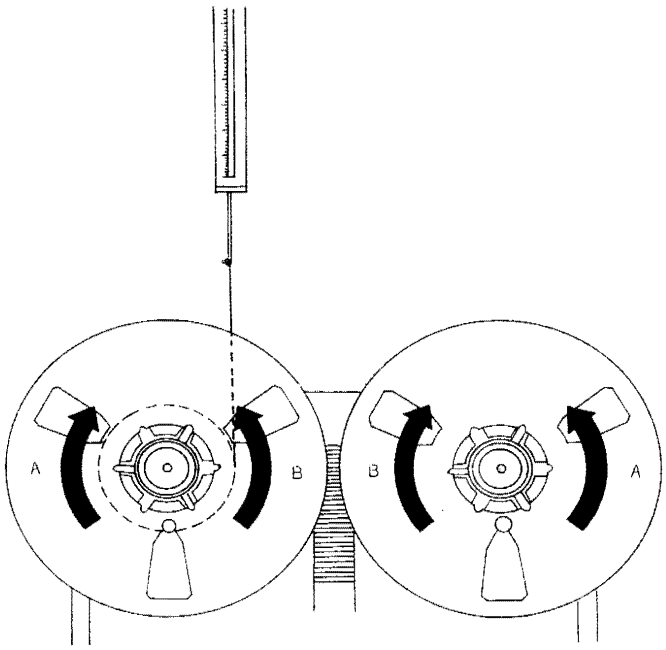


Figure 6-2 Brake Measurement

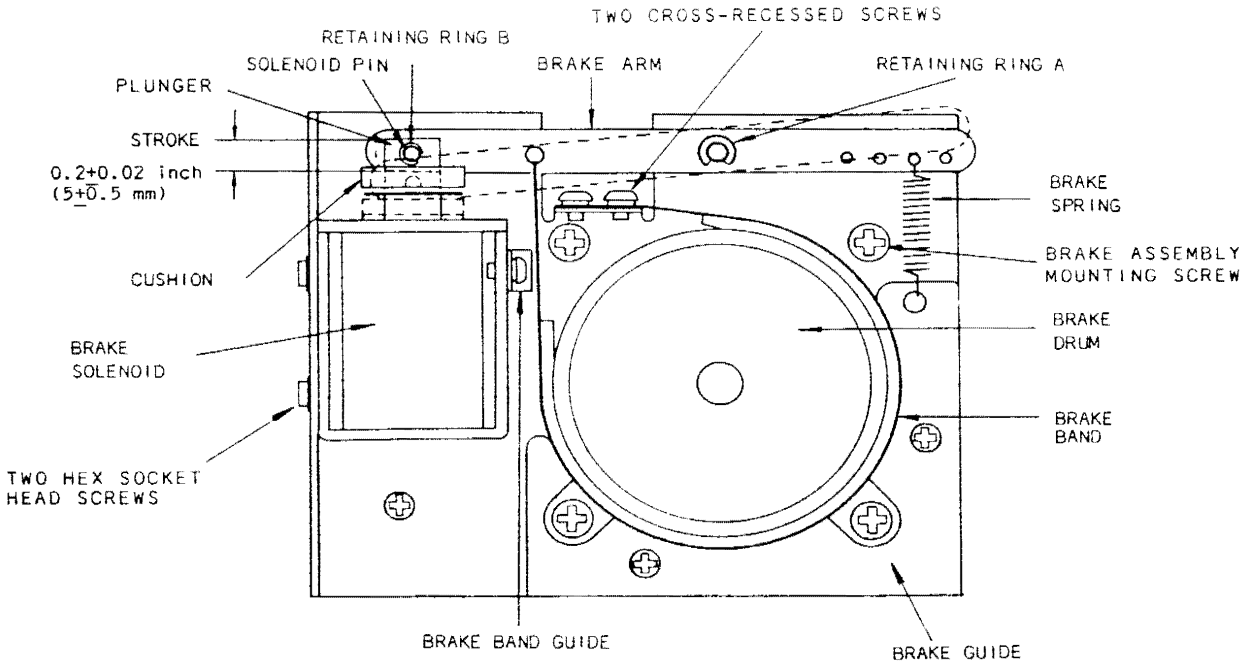


Figure 6-3 Brake Assembly Location

6-3 CAPSTAN PINCH ROLLER PRESSURE ADJUSTMENT

The capstan pinch roller's pressure against the capstan is determined by the pinch roller solenoid spring.
This force is adjusted by means of the nut shown in Figure 6-5.
The nut is adjusted to obtain a force of 2.7 ∿ 2.9 kg (5.9 ∿ 6.4 pounds).
The resistance of the solenoid coil rises with the temperature and causes the solenoid's force to decrease.
Therefore, do not adjust the pinch roller's pressure until the recorder has been operated in the play mode for at least 30 minutes.
The following procedure should be adhered to.

1. Remove the pinch roller cap by removing the screw on it.

2. Screw the hex socket head screws of M3 (length= 25 ∿ 30 mm) into this internal thread (screw hole).

3. Press the EDIT pushbutton, and then press the PLAY pushbutton.
   The pinch roller will move to make contact with the capstan and both will rotate.

4. Measure pinch roller pressure by using the Push function (piston part,not hook part) of the spring scale.
   Put the end of piston part of a 3 kg (0 ∿ 10 pounds) spring scale on M3 hex socket head screws from the direction of the capstan shaft. (shown in Figure 6-4)
   At this time do not touch the capstan shaft with piston part.

5. Push on the scale and note the scale reading when the pinch roller just loses contact with the capstan (the pinch roller stops rotating).
   The scale reading should be 2.7 ∿ 2.9 kg (5.9 ∿ 6.4 pounds).

6. If a proper scale reading was not obtained in step 5, loosen the locknut and adjust the pressure nut as shown in Figure 6-5. Turning the pressure nut towards the spring increases pinch roller pressure.
   Tighten the locknut.

7. After adjustment has been completed, check that the plunger of the solenoid reaches bottom within the solenoid coil (the pinch roller can easily be pushed away from the capstan).
   If the plunger of the solenoid does not reach bottom, loosen the locknut and turn the pressure nut away from the spring until the plunger of the solenoid reaches bottom.
   Recheck the pressure adjustment and tighten the locknut.

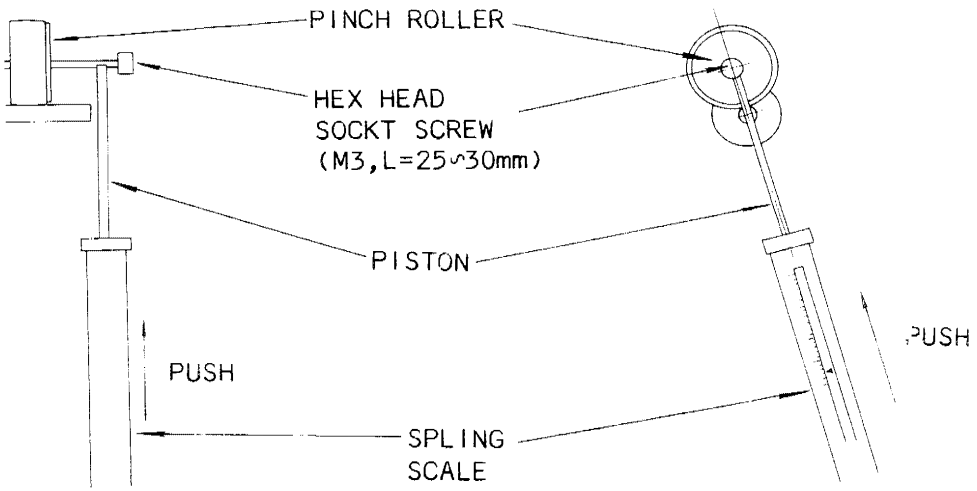


Figure 6-4 Pinch Roller Pressure Measurement

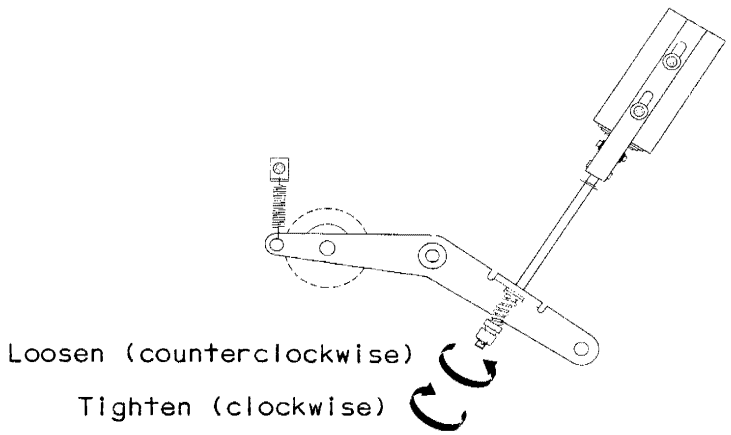


Figure 6-5 Pinch Roller Pressure Adjustment

6-4 TAPE SPEED ADJUSTMENT

The tape speed can only be adjusted on the dc servo capstan motor, by using the speed adjustment controls on the Servo Control P.C. Board. This adjustment follows the tape speed measurement in Section 7, and the speed adjustment controls shown in Figure 6-6 are adjusted as necessary.

It is important that the PITCH CONTROL should be placed in the "IN" fixed position during tape speed adjustment.

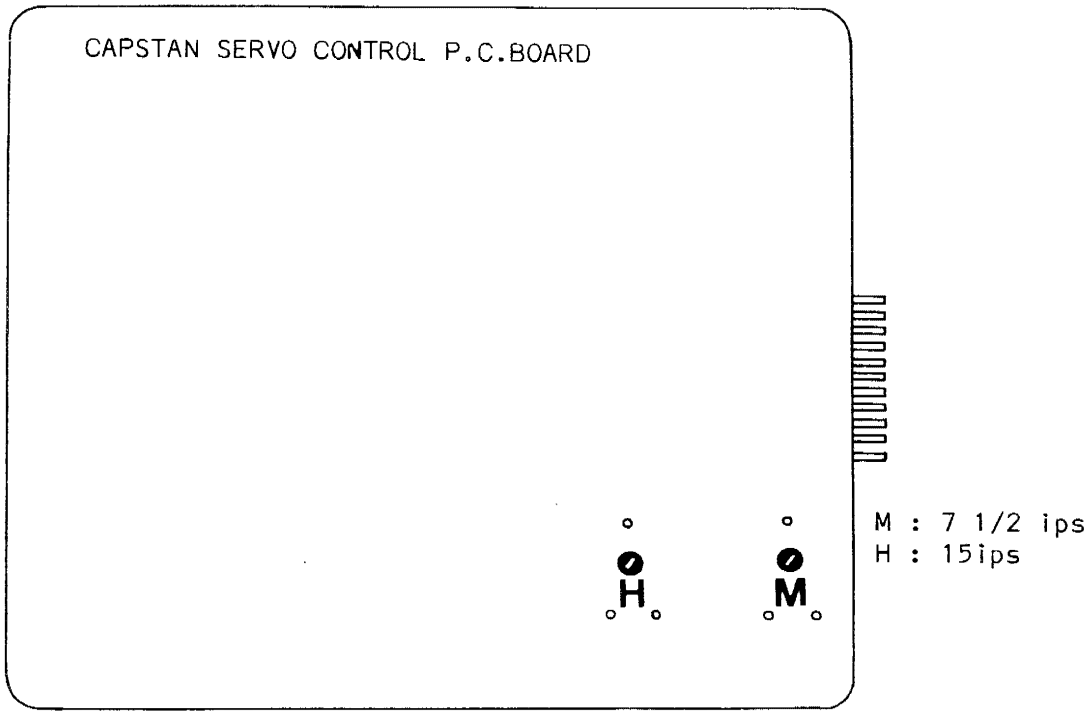
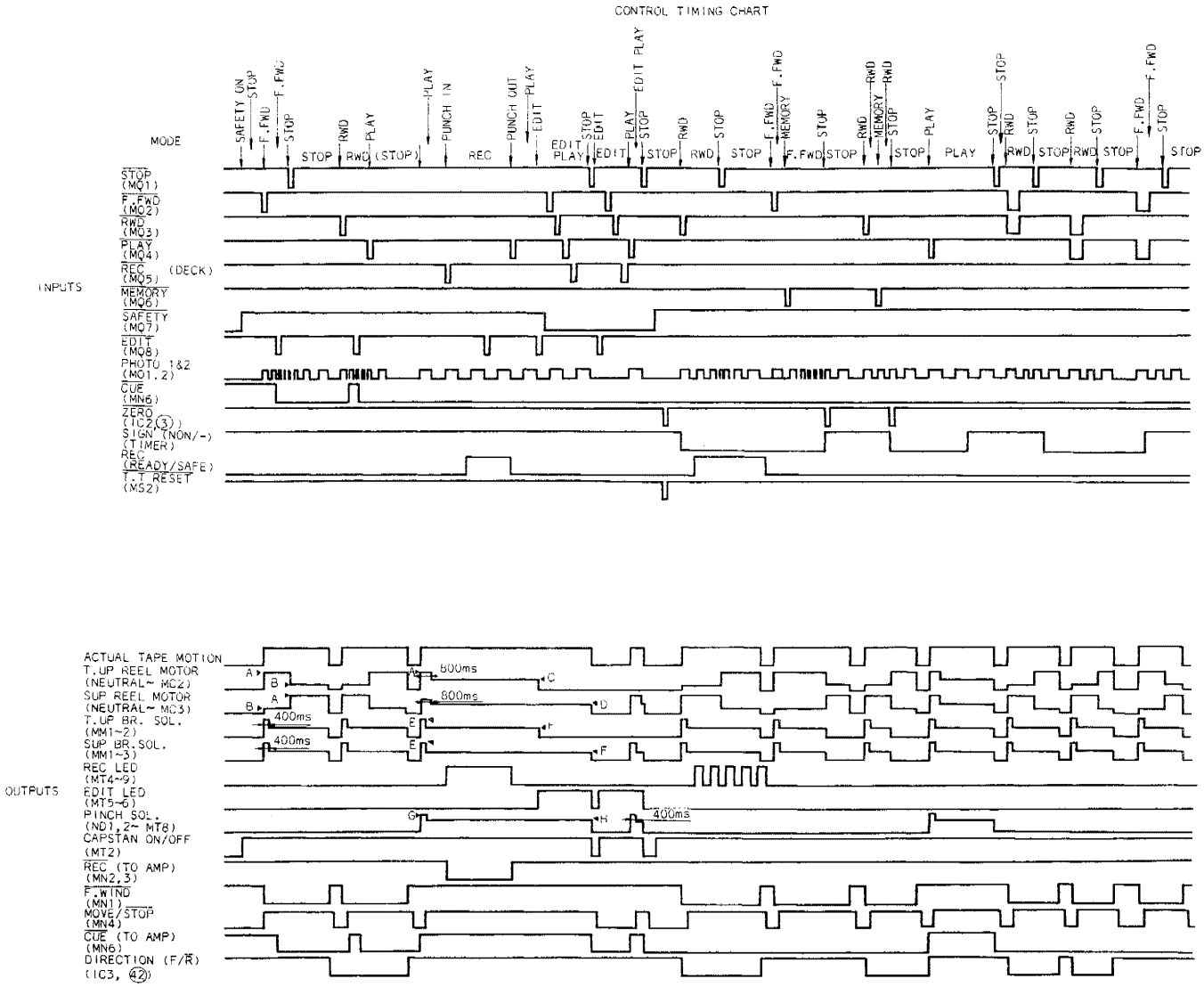


Figure 6-6 Capstan Servo Control P.C.B.

6-5 TAPE TRANSPORT TIMING CHART



* REEL MOTOR SUPPLY VOLTAGE (AC)

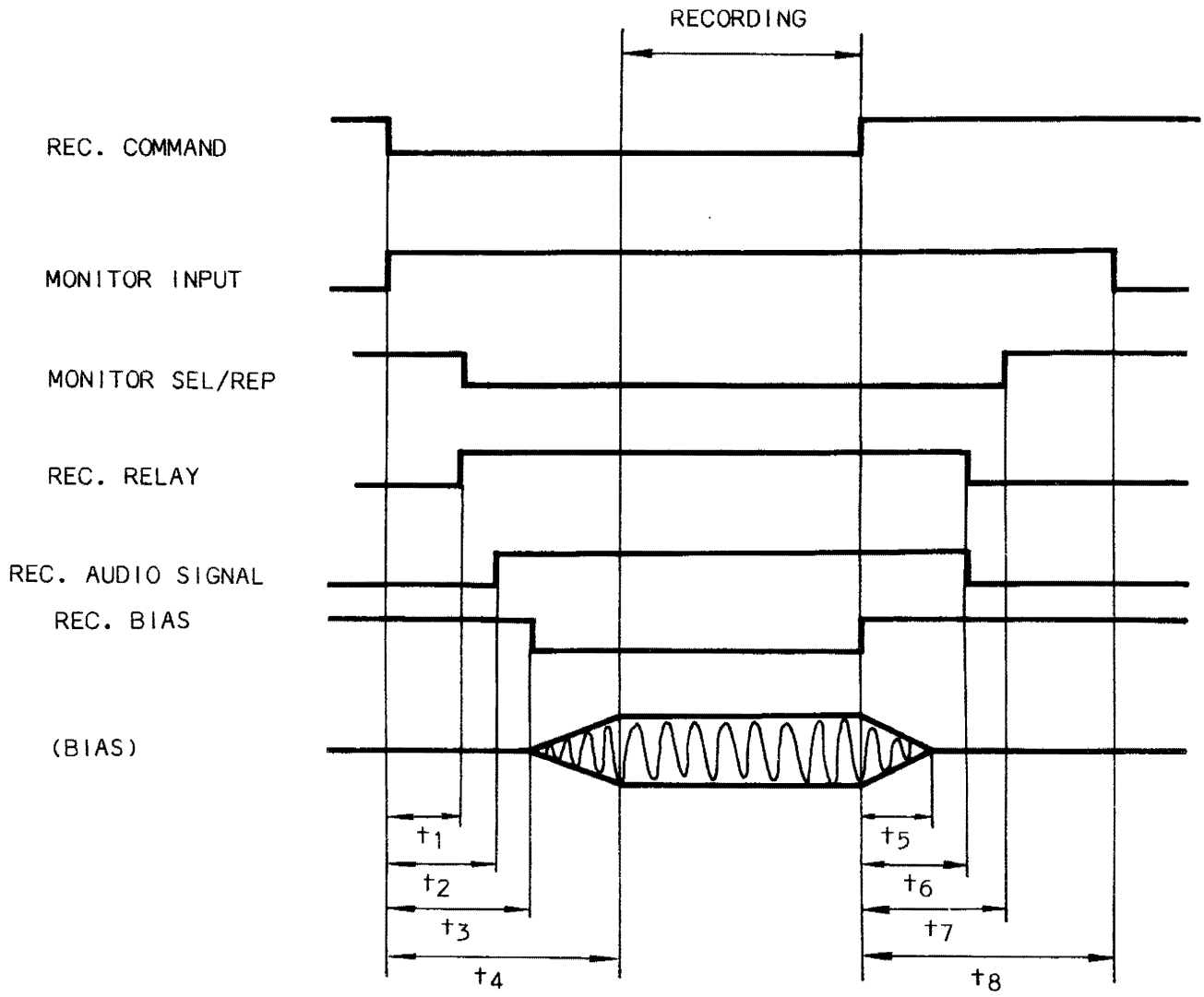
REEL SIZE	LARGE	SMALL
A	100 V	80 V
B	28 V	26 V
C	52 V	48 V
D	44 V	40 V

* * SOLENOID SUPPLY VOLTAGE (DC)

	VOLTAGE
E	27 V
F	12 V
G	22 V
H	17 V

Figure 6-7 Control Timing Chart

6-6 RECORDING PROCESS TIMING CHART



t1: MONITOR SEL/REP OFF & REC. RELAY ON operate time ; 36 msec
t2: REC. AUDIO SIGNAL start delay time ; 54 msec
t3: REC. BIAS start delay time ; 72 msec
t4: REC. BIAS rise time ;117 msec
t5: REC. BIAS fall time ; 40 msec
t6: REC. RELAY & REC. AAUDIO SIGNAL release delay time ; 54 msec
t7: MONITOR SEL/REP ON operate time ; 72 msec
t8: MONITOR INPUT OFF operate time ; 126 msec

Figure 6-8 Recording Process Timing Chart

SECTION 7
PERFORMANCE TESTING AND ELECTRONIC ALIGNMENT

Performance testing should be made at regularly scheduled intervals (every 150 hours or every month) to ensure that the recorder is performing within specifications.
These tests should also be performed whenever the recorder appears to be malfunctioning and repairs to the equipment that may affect performance.
If the performance test is not successful, proceed to the applicable electronic alignment procedure.
It is important to clean and demagnetize the head and tape guiding components before performing the following steps.

7-1 GENERAL NOTICE

It is important to clean and demagnetize the head and tape guiding components before performing the test and alignment procedures.
The levels indicated in this section are at a 1 KHz frequency at the reference recording level of 250 nWb/m.
In the case of IEC equalization, the reference record level is 320 nWb/m that is 1.2 dB above 250 nWb/m.
Refer to Figure 7-10.

7-2 TEST TAPES

Test tapes are precisely recorded under controlled conditions and must be correctly handled and stored to retain accuracy.
Handle the test tapes as follows:

1. Clean and demagnetize the head and tape guiding components before installing the test tape.

2. Never store test tapes in areas of temperature or humidity extremes.

3. Never run the test tapes on speeds other than a normal play run (never use the rewind or fast forward mode).
   This is further explained below.

During the alignment procedure, the rewind and fast forward modes should not be used.
After alignment, wind the tape completely on the takeup reel, interchange reels, thread the tape, and place the equipment in the play mode to wind the tape back on its original reel.
After extensive use, high frequency tones may be drop as much as 2 dB.
In addition, flutter indication may rise even though actual flutter remains unchanged.
Flutter increase is caused by demagnetization of the recorded signal from repeated plays, tape deformation due to tape tension, changes in temperature and humidity, and increased dropout resulting from tape wear.

7-3 TEST CONDITIONS

The test conditions specified in the following steps are to be met prior to performing the tests.
After these test conditions are met, continue with the following procedures for checking overall signal-to-noise, overall distortion, crosstalk, erasure, tape speed and flutter.

1. Clean and demagnetize the heads.

2. Use high quality low-noise tape such as Ampex 406, 407, 456, or Scotch 206, 207, 226, 246, 250, or an equivalent, and bulk erased to tape.

3. Turn the power on and allow the unit to warm up for 20 minutes.

4. Be sure the head cover is installed for all tests.

7-4 PERFORMANCE TESTS

Before performance testing, line input level check, line output level check, input SRL check , reproduce frequency response check, record level check, an overall frequency response check, and a SEL/REP level check are necessary.
Refer to section 7-6, ELECTRONIC ALIGNMENT, in this manual for checking procedures.
For performance testing, at first proceed as follows.
Demagnetize and clean the heads and all guiding component.

1. Set the REEL switch to the appropriate position.

2. Set the LINE OUTPUT LEVEL switches located on the REC/REP Amp. P.C. Board to "H" (has been set at the factory as standard), set each READY/SAFE pushbutton switch to the "OUT" SAFE position, and select INPUT of the MONITOR SELECT after pushing the INDIVUDUAL pushbutton switch.

3. Thread a reel of bulk-erased tape onto the transport, and push the PITCH CONTROL knob to its fixed position.

7-4-(1) OVERALL SIGNAL-TO-NOISE

The overall signal-to-noise test requires an ASA "A" weighted filter for weighted measurement and a noise filter for unweighted measurement to eliminate noise outside the audible frequency band.
The filter should be built into a small aluminum box and its circuit is shown in Figure 7-1.

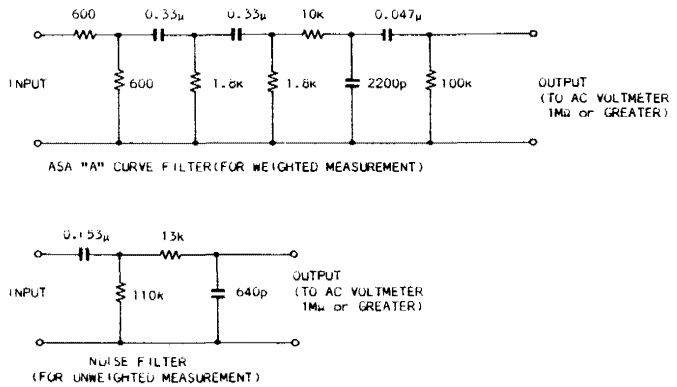


Figure 7-1 Filter Schematics

The signal-to-noise test ratio depends on reproduce equalization, bias calibration, and record equalization.
Proceed as follows:

1. Connect the filter to CH-1 LINE OUT and connect an ac voltmeter to the output of the filter.

2. Set the MONITOR switch to the "REPRO" position, or press the ALL REPRO pushbutton switch, and set the CH-1 INPUT (INPUT SRL switch is off) control to its full clockwise position.
   Reset the Tape Timer to "0:00:00".

3. Start the record mode and record for one minute.
   Rewind the tape to the "0:00:00" indication on the timer.

4. Reproduce the recorded portion and read the noise level on the ac voltmeter.

5. The S/N ratio is calculated by adding +4 dB standard level to the indication of the ac voltmeter, and an extra 12.4 dB for NAB equalizer or 11.2 dB for IEC equalizer.
   [Peak record level (1040 nWb/m) is +12.4dB over 0 VU for NAB (250 nWb/m), and +11.2 dB over 0 VU for IEC (320 nWb/m).]

6. Repeat steps 1 through 4 for the other channels as required, and change the tape speed to check all signal-to-noise ratios.

Table 7-1 Signal-to-noise specifications

EQ / Tape Speed	NAB		IEC	
	Weighted	Unweighted	Weighted	Unweighted
15 ips	70 dB	66 dB	70 dB	66 dB
7.5 ips	70 dB	66 dB	70 dB	66 dB

If signal-to-noise specifications are not met, check and adjust the following items.

1. LINE OUTPUT LEVEL switch position.
2. RECORD BIAS adjustment.
3. Reproduce equalization.
4. Record equalization.
5. Record and/or reproduce electronics
6. Head magnetization.
7. Magnetic flux from a motor, a soldering iron or a transformer near the recorder.

7-4-(2) OVERALL DISTORTION TEST

For an accurate distortion check, it is necessary to use an audio oscillator with less than 0.1% distortion and a wave analyzer with an adjustable bandwidth capability.
A wave analyzer with too narrow bandwidth may make it difficult to measure harmonics due to flutter components of the transport.
Measured total harmonic distortion will be affected by tape and modulation noise in addition to harmonic distortion.
To measure overall harmonic distortion, proceed as follows:

1. Connect a wave analyzer to CH-1 LINE OUTPUT and connect an audio oscillator to CH-1 LINE INPUT.

2. Set the MONITOR switch to the "REPRO" position, or press the ALL REPRO pushbutton switch, set the audio oscillator frequency to 1000 Hz.

3. Set the wave analyzer frequency to 1000 Hz, the bandwidth to 100 Hz, and the mode selector switch to AFC.

4. Start the record mode and adjust the CH-1 LINE INPUT control for a 0 VU reading on the VU meter.

5. Adjust the fine tuning control and input level control on the wave analyzer for a full scale reading of 100%.

6. Change the wave analyzer tuning control to 2000 Hz and measure the second harmonic content.
   The second harmonic content should not exceed 0.1%.

7. Change the wave analyzer tuning control to 3000 Hz and measure the third harmonic content.
   Third harmonic distortion is dependent upon the type of tape used, and the accuracy of the RECORD BIAS setting.
   A typical reading for low noise high output tape is 0.4%.

If distortion specifications are not met, check and adjust the following items.

1. RECORD BIAS adjustment.
2. Head magnetization.
3. Record and/or reproduce electronics.

7-4-(3) CROSSTALK TESTS

It is important that blank bulk-erased tape be used for the crosstalk test.
To measure crosstalk adjacent channels, proceed as follows:

1. Follow the procedure in the Overall Distortion test, perform steps 1 through 5.

2. Connect a wave analyzer from the output of CH-1 to CH-2 LINE OUTPUT.

3. Measure the crosstalk in dB.
   Crosstalk should not exceed 55 dB.

4. Repeat steps 1 through 3 for the other channels as required.
   If crosstalk specifications are not met, record and reproduce head alignment (height and tape contact) are incorrect or the record or reproduce head is defective.

7-4-(4) ERASURE TEST

It is important that blank bulk-erased tape be used in the erasure test.
To measure depth of erase, proceed as follows:

1. Follow the procedure in the Overall Distortion Test, perform steps 1 through 5.
   A 1000 Hz signal is being recorded at SRL. (0 VU)

2. Adjust the INPUT control for a 1000 Hz signal being recorded at 10 dB (+10 VU) above SRL.
   Continue recording for a few minutes.

3. Disconnect the audio oscillator.

4. Rewind and reproduce the recorded section.
   Check and readjust controls of the wave analyzer as necessary for a full scale reading of 100%.

5. Press the RECORD pushbutton to place the recorder in the record mode.
   As the tape is being erased, adjust the percent scale on the wave analyzer to read the residual 1000 Hz tone.

6. Repeat the same procedure for the other channels.

7. The depth of erase should be more than 70 dB.

If erasure specifications are not met, check and adjust the following items.

1. Erase and/or record head alignment (height, tape contact).
2. Erase head wear.
3. Erase head surface cleanliness.
4. Bias oscillator adjustment.

7-4-(5) TAPE SPEED MEASUREMENT

A flutter test tape is used for measuring tape speed.
Since tape tension affects tape speed, it is important for accurate measurement that the flutter test tape used is attached to the end of a full wound reel of blank tape as shown in Figure 7-2 , and is used with the REEL pushbutton set to the appropriate reel size.
Clean heads, capstan shaft, pinch roller, and all tape guiding components in the tape path before measurement.
Proceed as follows:

1. Place the PITCH CONTROL in the fixed position and set the READY/SAFE toggle switches of all channels to "SAFE" positions.

2. Connect a flutter meter with a frequency counter to the LINE OUT and press the All REPRO pushbutton switch.

3. Set the SPEED switch to "OUT" HIGH position and use the test tape at 15 ips.

4. Attach the test tape to a 10 1/2 inch NAB reel as shown in Figure 7-2 , place the test tape on the supply reel table, thread the tape, and set the REEL switch to the "OUT" LARGE position.

5. Place the recorcer in the play mode and note the reading on the frequency counter.
   The reading should be between 2994 and 3006 Hz (3000Hz±0.2%).

6. Repeat the procedure at a point towards the end of the reel, and for 7 1/2 ips.

7. If adjustment is necessary, refer to Section 6-4.

If speed accuracy is not within ±0.2%, check and adjust the following items.

1. Pinch roller tire wear and pressure.
2. Brakeshoe for brake drum contact.
3. Power correctness.
4. Pinch roller and capstan cleanliness.
5. Tape tension.

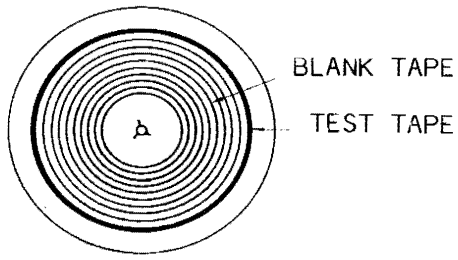


Figure 7-2 Test Tape Loading

In addition, check the following items for the dc servo capstan motor.

6. Servo control circuit.
7. Capstan motor.

NOTE

To avoid a counting error due to the line frequency, it is recommended that the time-base of the frequency counter be set to the crystal oscillator position.

7-4-(6) FLUTTER AND WOW TEST

It is recommended that these checks are made with standard flutter test tapes (See Table 4-2) which are recorded on precise equipment to produce less than 0.03% rms flutter.
After recording a section of tape, rewind to the beginning and start the tape in the reproduce mode.
Flutter meters are sensitive to amplitude modulation that results from poor head-to-tape contact or from signal dropout.
Therefore, clean the heads before making a flutter test.
The following method is used with a test tape:
It is important that the flutter test tape used is attached to the end of a full wound reel of blank tape as shown in Figure 7-2, and is used with the REEL pushbutton set to the appropriate reel size.

1. Place the PITCH CONTROL to the "IN" fixed position and set the READY/SAFE toggle switches of all channels to the "SAFE" position.

2. Connect a flutter meter to the LINE OUT of an inner track channel and press the ALL REPRO pushbutton switch.

3. Set the selector switch of the flutter meter to the NAB weighted position, set the SPEED switch to HI, and use the test tape at 15 ips.

4. Attach the test tape to a 10 1/2 inch NAB reel as shown in Figure 7-2, place the test tape on the supply reel table, thread the tape, and set the REEL switch to the "OUT" LARGE position.

5. Place the recorder in the play mode and note the reading on the flutter meter.
   The reading should be as shown in Table 7-2.

6. Repeat the procedure at a point towards the end of the reel, and for 7 1/2 ips.

The following method is used when a test tape is not available:

1. Connect the oscillator signal output (3 KHz) of the flutter meter to an inner channel (not an edge channel) LINE INPUT connector of the recorder.

2. Connect the same channel LINE OUTPUT connector of the recorder to the signal input of the flutter meter.

3. Set the SPEED switch to "out" HIGH, press the ALL REPRO pushbutton switch, start the record mode, and adjust the appropriate INPUT control.

4. Rewind and reproduce the recorded portion, and note the flutter and wow on the flutter meter.

5. Check the flutter and wow at a low tape speed, and check it at a point towards the end of the reel.

Table 7-2 Flutter and Wow Specification

Tape speed	Flutter and wow
15 ips	0.05%
7.5 ips	0.06%

Flutter and wow can be caused by any element in the tape path. Excessive flutter and wow may be traced by observing the flutter component on an oscilloscope screen connected to the demodulator output of the flutter meter.
If the fluctuation rate observed on the oscilloscope coincides with the rotational elements, such as the supply or takeup reel, capstan or pinch roller, the problem source may be easily traced.
Other sources of excessive flutter and wow are:

1. Defective capstan servo control.
2. Damaged capstan motor.
3. Capstan needs lubrication (dry sleeve bearing).
4. Brakeshoe is contacting brake drum.
5. Defective tape reels or tape.
6. Pinch roller tire is worn or has insufficient pressure, or the plunger of the pinch roller solenoid does not reach its bottom.
7. Dirty pinch roller and capstan.

7-5 ACCESS TO ELECTRONICS ASSEMBLY

The record/reproduce electronics assembly can easily be opened for adjustment.

To gain access to the electronics assembly, proceed as follows.

1. Remove six screws on the electronics rear cover as shown in Figure 7-3.

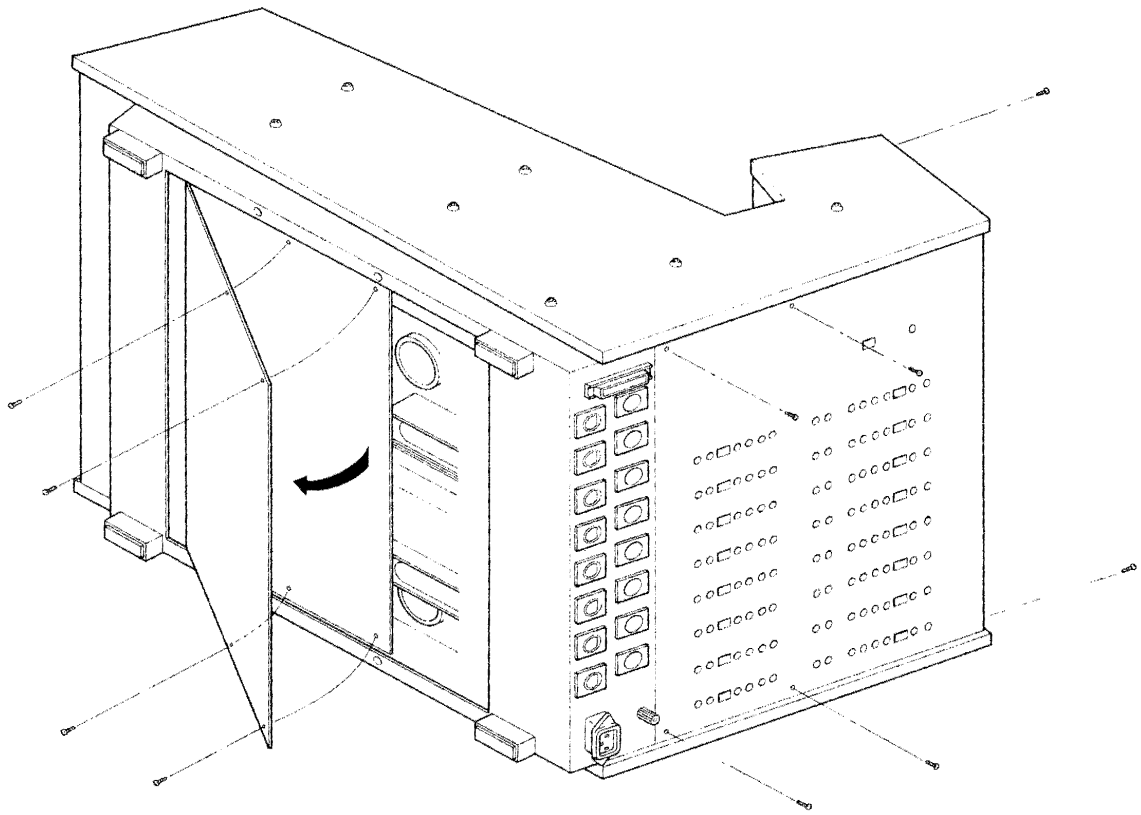


Figure 7-3 Electronics Access

7-6 ELECTRONIC ALIGNMENT

If the previous performance tests were not successful, perform the following applicable reproduce, record, and bias amplifier alignment procedures.

7-6-(1) REPRODUCE SYSTEM

Reproduce system alignments consist of reproduce head azimuth adjustment, frequency response adjustment, SRL (REPRO level) adjustment and SEL/REP. level adjustment.

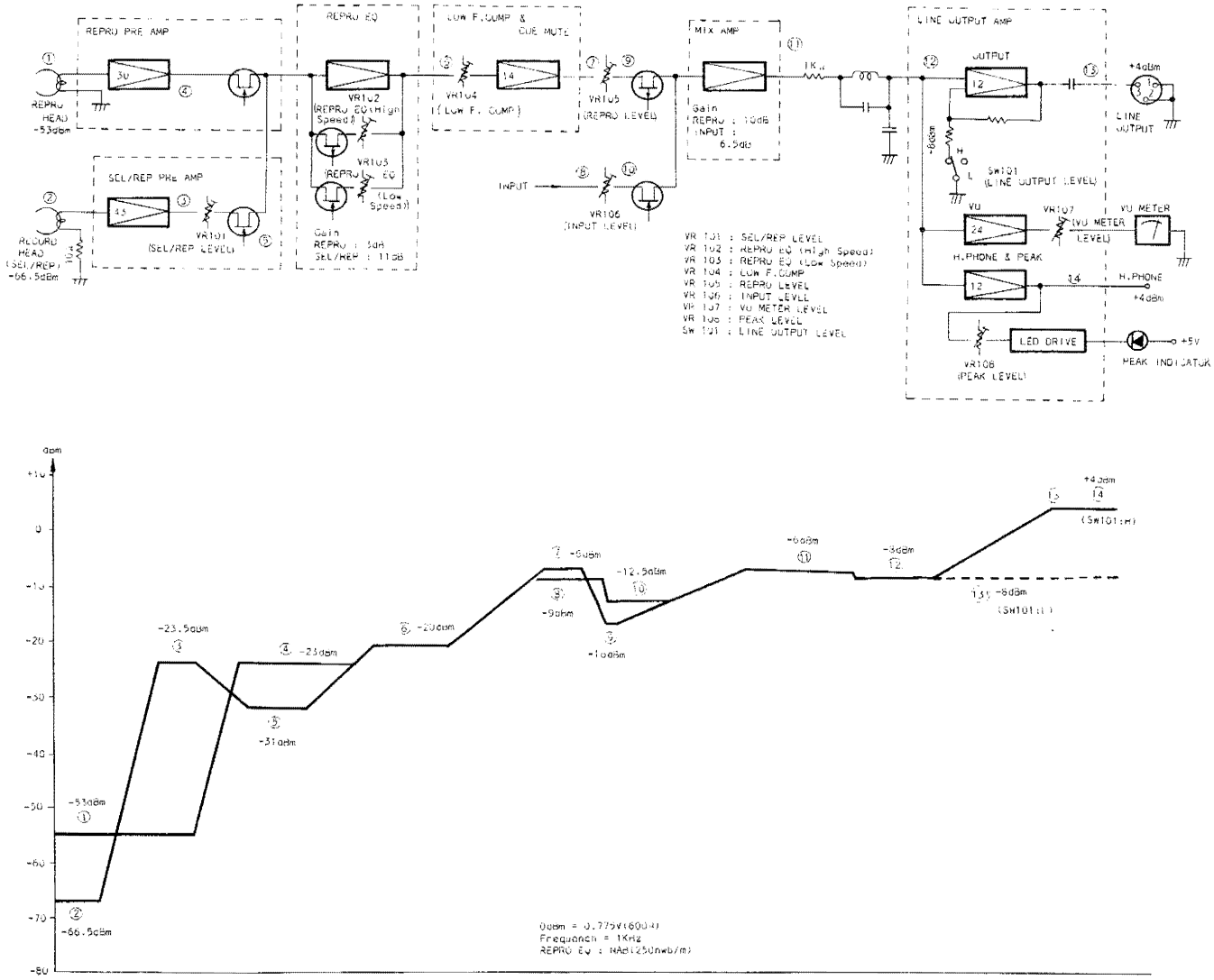


Figure 7-4 Reproduce System Block and Level Diagram

7-6-(2) REPRODUCE HEAD AZIMUTH ADJUSTMENT

The head azimuth adjustment should be adjusted with a "LOW" tape speed (7 1/2 ips) for critical alignment.
Use the test tapes listed in Table 4-3.

1. Thread a low speed test tape, depending on the equalization of the equipment, to the recorder.

2. Connect the ac voltmeter to the LINE OUT connector.

3. Reproduce the coarse azimuth adjustment signal (500 Hz at 7 1/2 ips) of the test tape.

> *CAUTION*
>
> *DO NOT ADJUST ANY OTHER SCREW EXCEPT THE AZIMUTH ADJUSTMENT SCREW (LABELED "A3" IN FIGURE 7-5).*

4. Then, reproduce the fine azimuth adjustment signal (16 KHz at 7 1/2 ips) and adjust the azimuth screw "A3" for a maximum reading on the ac voltmeter.

5. If a maximum reading cannot be achieved within one full turn of the azimuth screw, a full head alignment may be required.
Refer to section 8 of this manual.

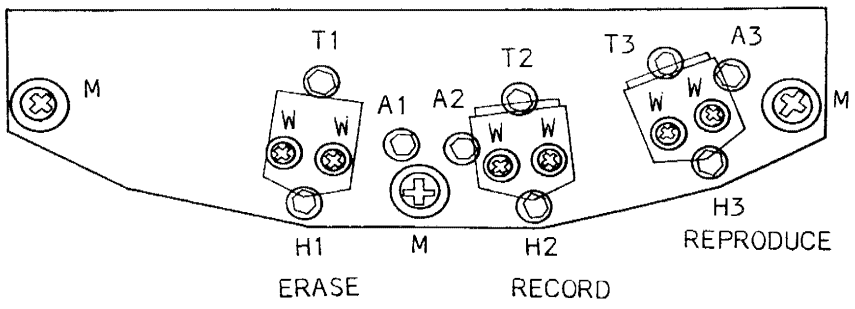


Figure 7-5 Head Assemly

7-6-(3) FREQUENCY RESPONSE

Since the reproduce equalizer circuit has high frequency independent controls for both 15 ips and 7 1/2 ips, an adjustment is made at first for 15 ips.
Table 7-3 shows the time constant and fluxivity at each equalizer.

1. Connect the ac voltmeter to the LINE OUTPUT connector.

2. Thread the test tape through the equipment.

For 15 ips:

3. Reproduce a 500 Hz signal on the test tape.
   At this time the value on the ac voltmeter is decided as standard.

4. Reproduce the frequency response test signal (from 31.5 up to 20 KHz) and note the reading on the ac voltmter.

5. Adjust the VR 102 adjustment controls with a frequency of 10 KHz for a 0 dB reading on the ac voltmeter.
   The reading should be 31.5 Hz to 20 KHz $\pm$2 dB.

For 7 1/2 ips:

6. Repeat steps 2 and 4 to at 7 1/2 ips tape speed.

7. Adjust the VR 103 adjustment controls with a frequency of 10 KHz for a 0 dB reading on the ac voltmeter.
   The reading should be 31.5 Hz to 16 KHz $\pm$2 dB.

8. Repeat steps 1 through 7 for the other channels as required.

Table 7-3 Equalizer Time Constants & Fluxivity

Equalization	Time Constants	Fluxivity
NAB 15 ips	3180 + 50 μ sec	* 250 nWb/m
IEC 15 ips	∞ + 35 μ sec	**320 nWb/m
NAB 7 1/2 ips	3180 + 50 μ sec	* 250 nWb/m
IEC 7 1/2 ips	∞ + 70 μ sec	**320 nWb/m

* short circuit flux

** open circuit flux

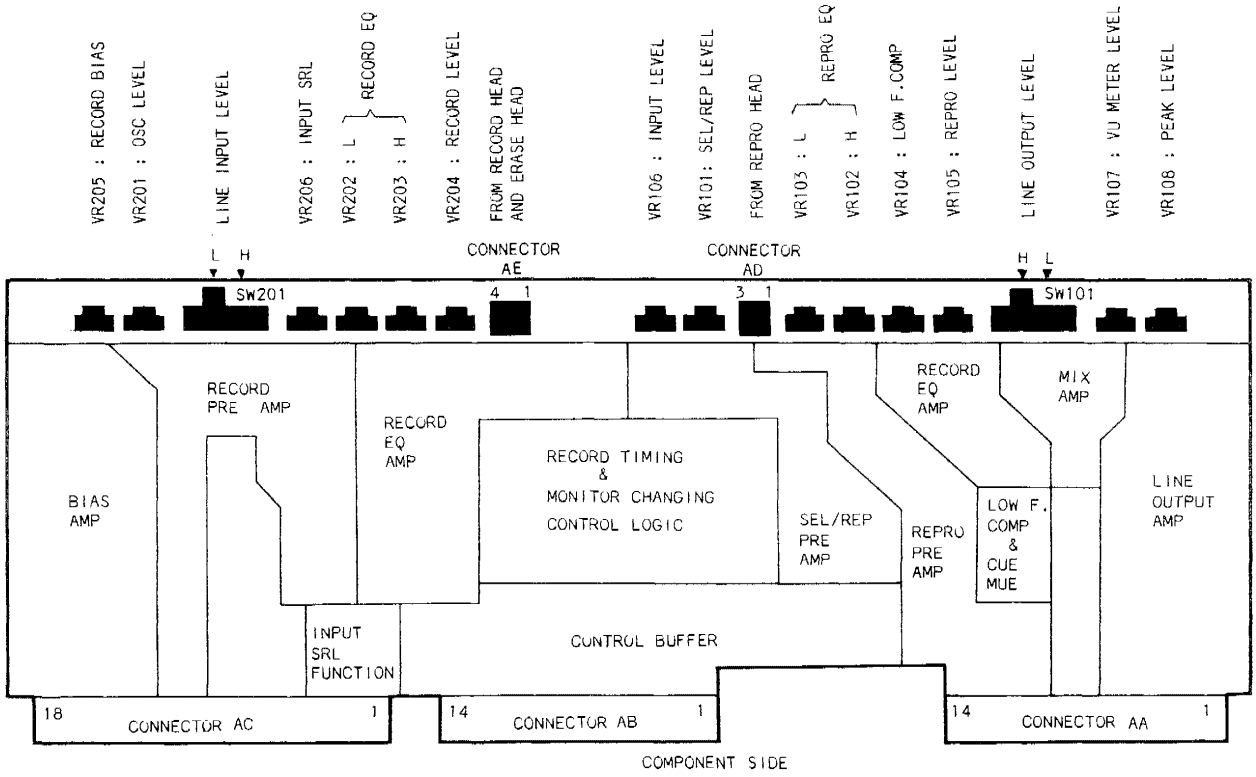


Figure 7-6 Location of Record/Reproduce Electronics

7-6-(4) SRL (REPRO LEVEL) ADJUSTMENT

1. Connect the AC voltmeter to the LINE OUTPUT connector.

2. Thread the 15 ips test tape through the equipment.

3. Reproduce the reference recorded flux on the test tape and adjust the VR 105 adjustment controls for a +4 dBm reading on the ac voltmeter. (LINE OUTPUT LEVEL switch is in "H" position.)

7-6-(5) SEL/REP. LEVEL ADJUSTMENT

1. Set each MONITOR switch to the SEL/REP position.

2. Reproduce the reference recorded flux and adjust the VR 101 adjustment controls for a +4 dBm reading on the ac voltmeter.

7-6-(6) RECORD SYSTEM

Before performing record system adjustments, a reproduce system adjustment should be made.

7-6-(7) RECORD HEAD AZIMUTH ADJUSTMENT

The head azimuth may be adjusted at a low tape speed for critical head alignment and at 10 dB below the standard recording level.

1. Connect the ac voltmeter to the LINE OUTPUT connector and connect the audio oscillator to the EXT OSC jack.

2. Set the TEST OSC switch to the EXT OSC, the LINE OUTPUT LEVEL switch to the HIGH position, the LINE INPUT LEVEL switch to the Low position, and the MONITOR switch to the "REPRO" position.

3. Thread a blank tape through the equipment.

4. Set the audio oscillator frequency to 1 KHz.

5. Place the equipment in the record/reproduce mode and adjust the INPUT control for -6 dBm on the ac voltmeter.

6. Adjust the record head azimuth screw "A2" for a maximum reading on the ac voltmeter at a frequency of 15 KHz for 7 1/2 ips record/reproduce mode.

> *CAUTION*
>
> *DO NOT ADJUST ANY OTHER SCREW EXCEPT THE AZIMUTH ADJUSTMENT SCREW (LABELED "A2" IN FIGURE 7-5).*

7. If a maximum reading can not be achieved within one full turn of the azimuth screw, or a maximum reading on the ac voltmeter is well below -6 dBm, a full head alignment may be required. Refer to section 8 of this manual.

7-6-(8) RECORD BIAS ADJUSTMENT

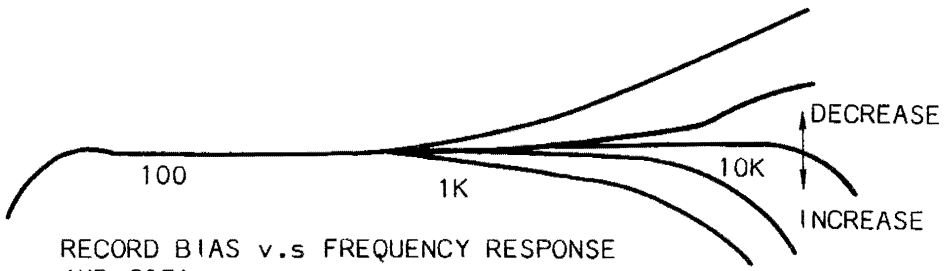
Figure 7-7 shows the variation of the frequency response by the bias set, the RECORD EQ, and low frequency compensation adjustment control.
Figure 7-9 shows the characteristics of the bias current v.s. output and distortion of scotch #226 tape.
The record bias should be set at 3 dB over bias at 10 KHz for low distortion and high maximum output level (MOL).
The overall frequency response may be adjusted with the RECORD EQ, the RECORD BIAS, and LOW F.COMP. adjustment controls for flat frequency response curve.

1. Set the tape speed to 15 ips, and set the MONITOR switch to the "REPRO" position.

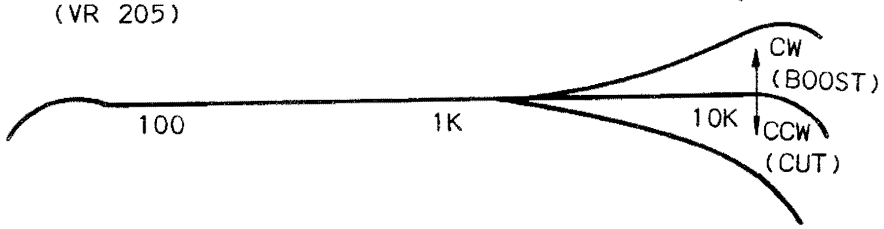
BIAS ADJUSTMENT AT 10 KHz

2. Record and reproduce the 10 KHz signal of the TEST OSC and adjust the LINE INPUT control for a +4 dBm reading on the ac voltmeter.

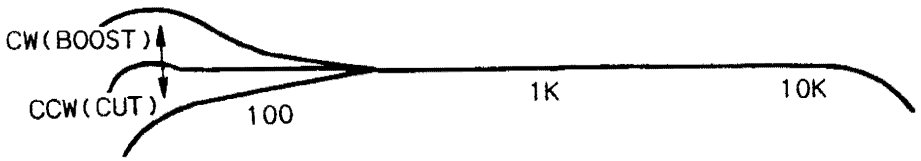
3. Adjust the RECORD BIAS adjustment controls (VR 205) for a peak indication on the ac voltmeter and then turn the RECORD BIAS adjustment controls clockwise until a decreased level of 3.0 dB is obtained.
   The standard biasing point of the MX-5050 MKⅢ-8 is at 3.0 dB overbias at 10 KHz for 15 ips.



RECORD BIAS v.s FREQUENCY RESPONSE
(VR 205)

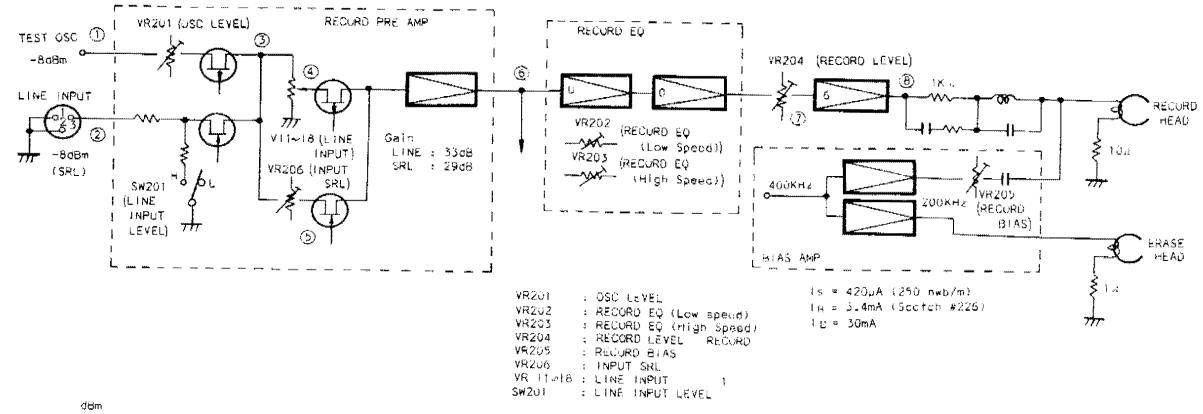


RECORD EQ v.s FREQUENCY RESPONSE
(VR 202, VR 203)



LOW FREQUENCY COMPENSATION v.s FREQUENCY RESPONSE
(VR104)

Figure 7-7 Overall Frequency Response



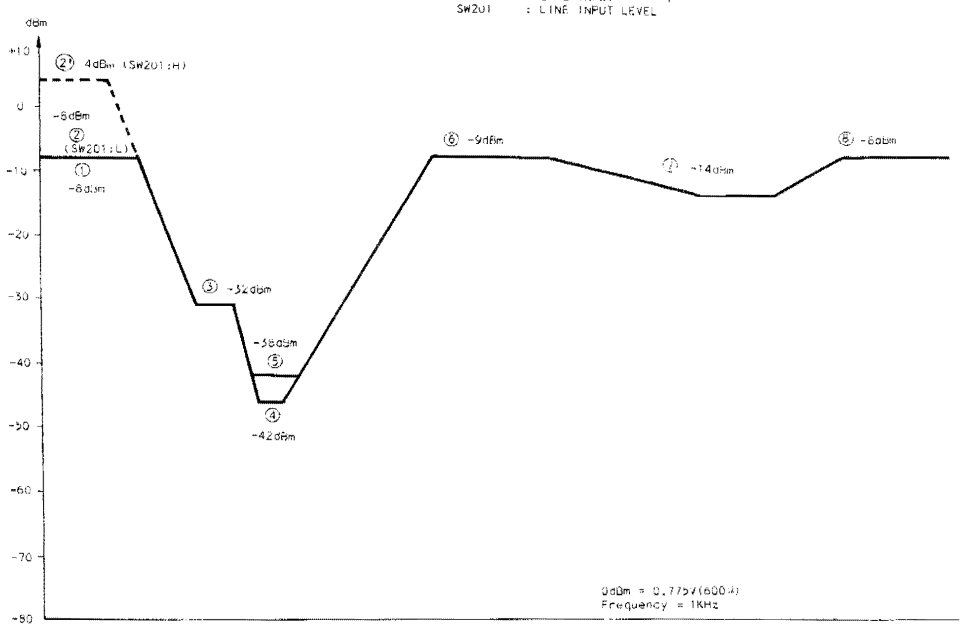


Figure 7-8 Record System Block and Level Diagram

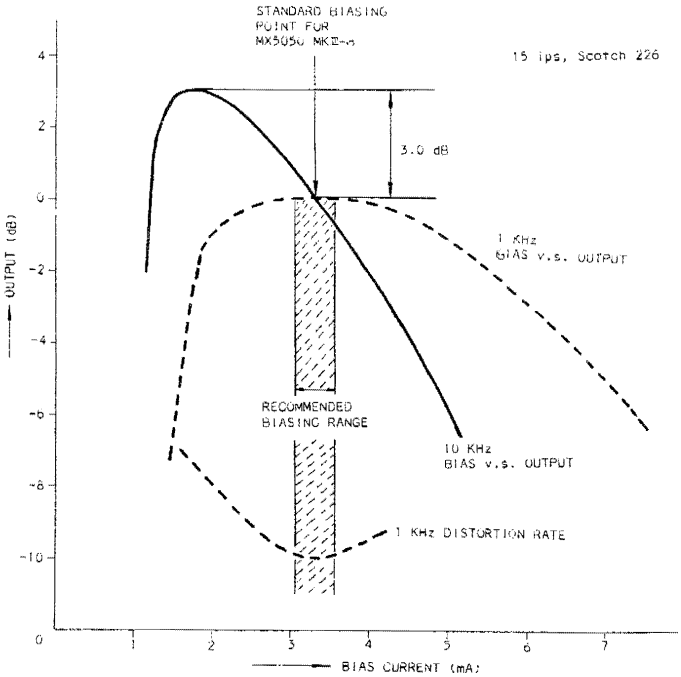
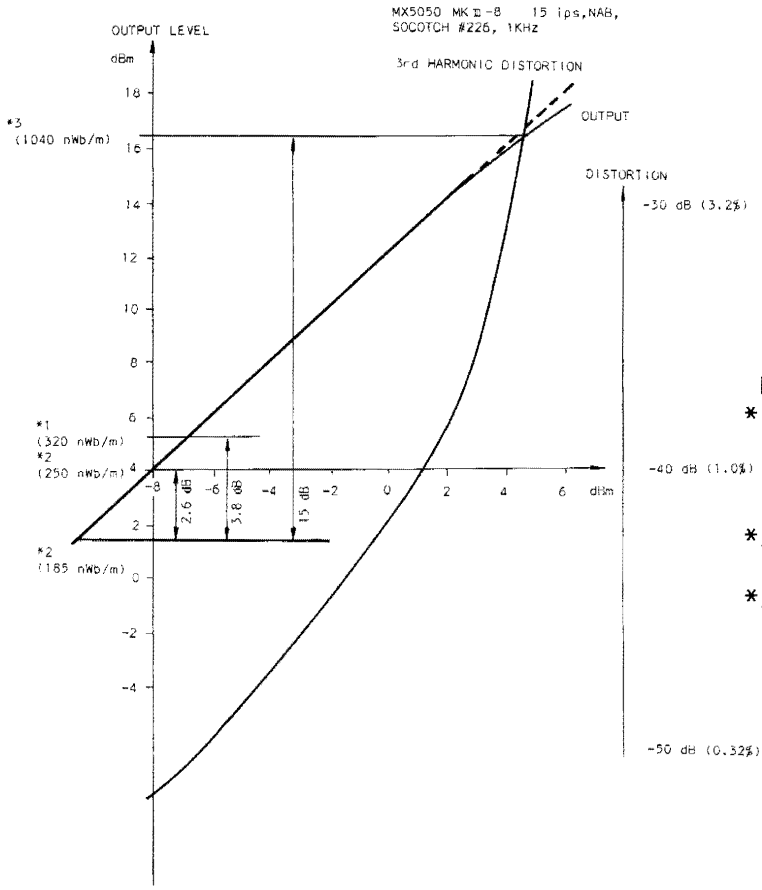


Figure 7-9 Bias Current v.s. Output and Distortion



NOTE

*1 : 320 nWb/m : DIN REFERENCE LEVEL
This is "open circuit flux" and corresponds to 290 nWb/m of "short circuit flux".

*2 : 250 nWb/m, 185 nWb/m
These are "short circuit flux".

*3 : 1040 nWb/m : Reference level for signal to noise ratio measurement and trigger level for peak indicator.

Figure 7-10 Input v.s. Outpaut and Distortion

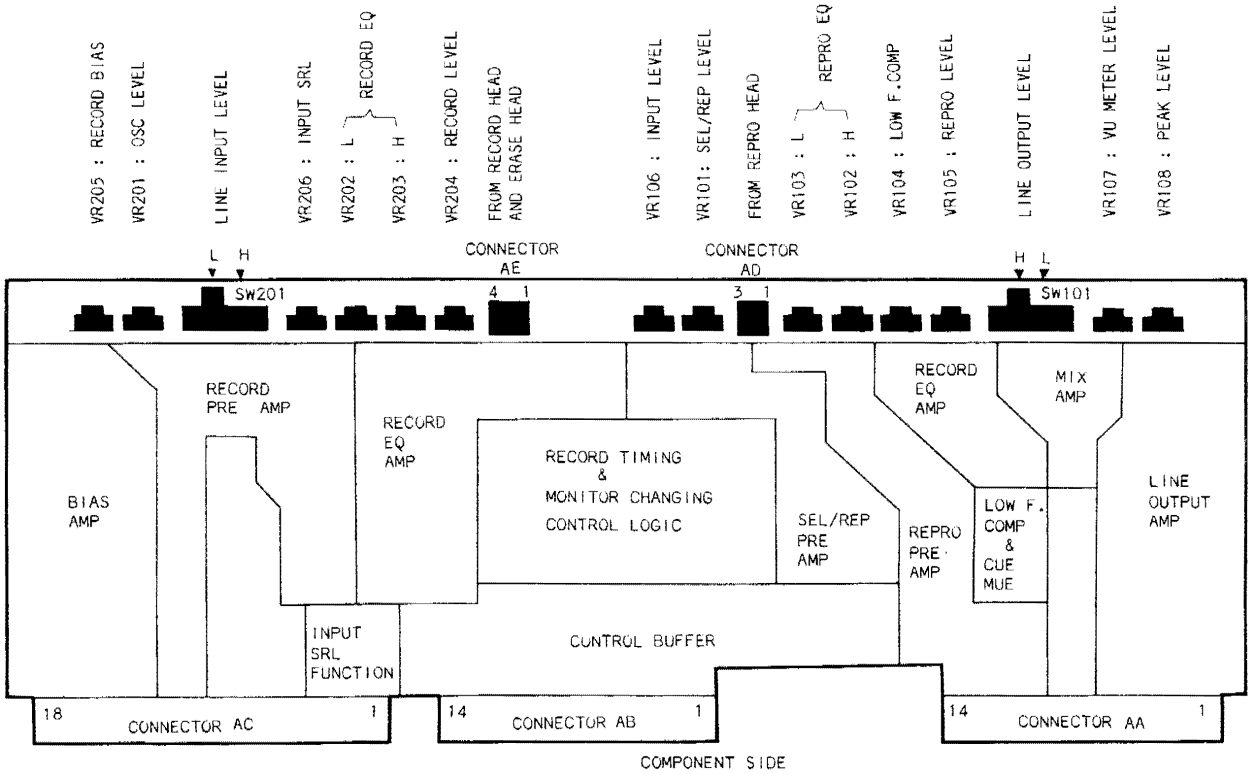


Figure 7-11 Location of Record/Reproduce Electronics

For 7 1/2 ips:

8. Shift the frequency to 1 KHz and adjust the LINE INPUT control to obtain a -6 dBm (-10 VU) reading on the ac voltmeter with the record mode.

9. Shift the frequency to 10 KHz and adjust the RECORD EQ. LOW adjustment controls (VR 202) to obtain a -5.5 dBm reading on the ac voltmeter.

10. Vary the frequency from 20 Hz to 20 KHz and confirm that the frequency response is within the specifications .
    The frequency response specification should be 20 Hz to 20 KHz ±2 dB.

NOTE

If the specified frequency response characteristics were not obtained in the above procedures, adjust the record biasing within the recommended biasing range (from 2.5 dB to 3.5 dB over bias at 10 KHz).

7-6-(10) MONITOR INPUT LEVEL and VU METER LEVEL ADJUSTMENT

1. Connect the audio oscillator to the EXT OSC jack and set the TEST OSC switch to the EXT OSC, and feed a 1 KHz for a -18 dBm signal.

2. Place the MONITOR switch in the INPUT position and place the INPUT LEVEL switch in the LOW position, and turn the INPUT controls fully clockwise.

3. Adjust the VR 106 to obtain a +4 dBm reading on the ac voltmeter.

4. Then, adjust the VR 107 to obtain a 0 dB indication on the VU meters.

5. Set audio oscillator level to -8 dBm.
   And adjust INPUT SRL adjustment (VR 206) to obtain 0 dB on the VU meters, INPUT SRL switch is set to the ON position.

6. Change the LINE OUTPUT LEVEL switch and the LINE INPUT LEVEL switch alternately, and confirm whether that value corresponds with the value of table 7-4.

Table 7-4 Standard Level

SRL INPUT			Minimum INPUT			VU Meter	OUTPUT		
SW	H	+4 dBm	SW	H	-9 dBm	0 dB	SW	H	+4 dBm
201	L	-8 dBm	201	L	-18 dBm		101	L	-8 dBm

SW101: LINE OUTPUT LEVEL Switch
SW201: LINE INPUT LEVEL Switch

7-6-(11) TEST OSC LEVEL ADJUSTMENT

Before making this adjustment, the monitor input level adjustment should be completed.

1. Shift the audio oscillator 1 KHz level to -8 dBm and adjust the INPUT controls for a 0 dB indication on the VU meter.

2. Set the TEST OSC switch to the 1 K position and adjust TEST OSC LEVEL adjustment control (VR 201) for 0 dB on the VU meter.

3. Set the TEST OSC switch to the 10 K position and adjust VR 501 on the Amplifier Control PCB (shown in Figure 7-12) for 0 dB on the VU meter.

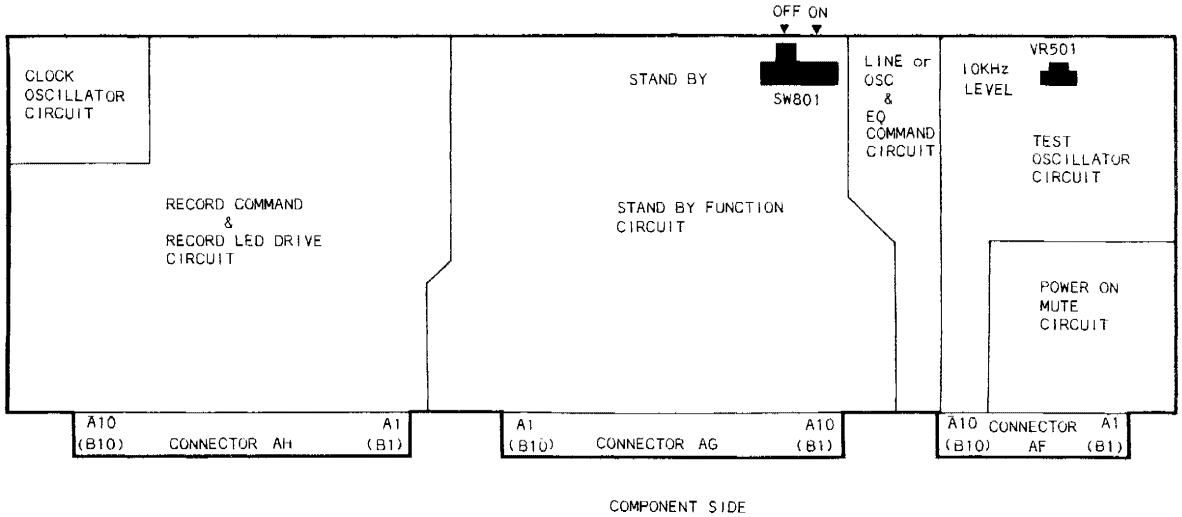


Figure 7-12 Location of AMP. Control Electronics

7-6-(12) RECORD LEVEL ADJUSTMENT

A record level adjustment should be made whenever the tape used with the equipment is changed and the head is replaced.

1. Set the SPEED selector switch to HIGH and set the MONITOR switch to the INPUT position.

2. Set the TEST OSC switch to 1 KHz and adjust the LINE INPUT controls to obtain a 0 dB indication on the VU meter.

3. Change the MONITOR switch to the REPRO position and place the equipment in the record mode.

4. Adjust the RECORD LEVEL adjustment controls (VR 204) to obtain a 0 dB indication on the VU meter (record/reproduce output level).

7-6-(13) PEAK INDICATOR TRIGGER LEVEL ADJUSTMENT

Peak indicators are triggered at the recorded flux level of 1040 nWb/m.
This point is 15 dB above 185 nWb/m, 12.4 dB above 250 nWb/m, and 11.2 dB above 320 nWb/m as shown in Figure 7-10.

1. Set the LINE INPUT LEVEL switch to the "L" position, the LINE OUTPUT LEVEL switch to the "H" position, and connect the audio oscillator to the EXT OSC jack.
   Set the TEST OSC switch to the EXT OSC, and feed a -8 dBm 1 KHz signal.

2. Set the MONITOR switch to the INPUT position and adjust the LINE INPUT controls for a 0 dB indication on the VU meter.
   (At this time INPUT SRL switch is set to the OFF position.)

3. For NAB equalization, shift the feeding level of the audio oscillator to +4.4 dBm.

4. For IEC equalization, shift the feeding level of the audio oscillator to +3.2 dBm.

5. Turn the VR 108 adjustment controls fully counterclockwise and then clockwise until each peak indicator in the VU meter illuminates.

7-6-(14) STAND-BY FUNCTION

In the "ON" position, if one of the channels is changed from SAFE to READY, the MONITOR mode of this channel changes to INPUT from SEL/REP or REPRO; in addition, the transport is in STOP, F.FWD or RWD.

SECTION 8
MAJOR COMPONENT REPLACEMENT

Prior to replacing major components, perform all the steps for access to the transport.

8-1 REEL MOTOR ASSEMBLY REPLACEMENT

8-1-(1) REEL TABLE REPLACEMENT AND HEIGHT ADJUSTMENT

The reel table may be removed by removing the three cross-recessed screws accessible from the front of the transport.
To adjust the reel table height, loosen the two hex socket head screws in Figure 8-1, adjust the height and retighten the screws.

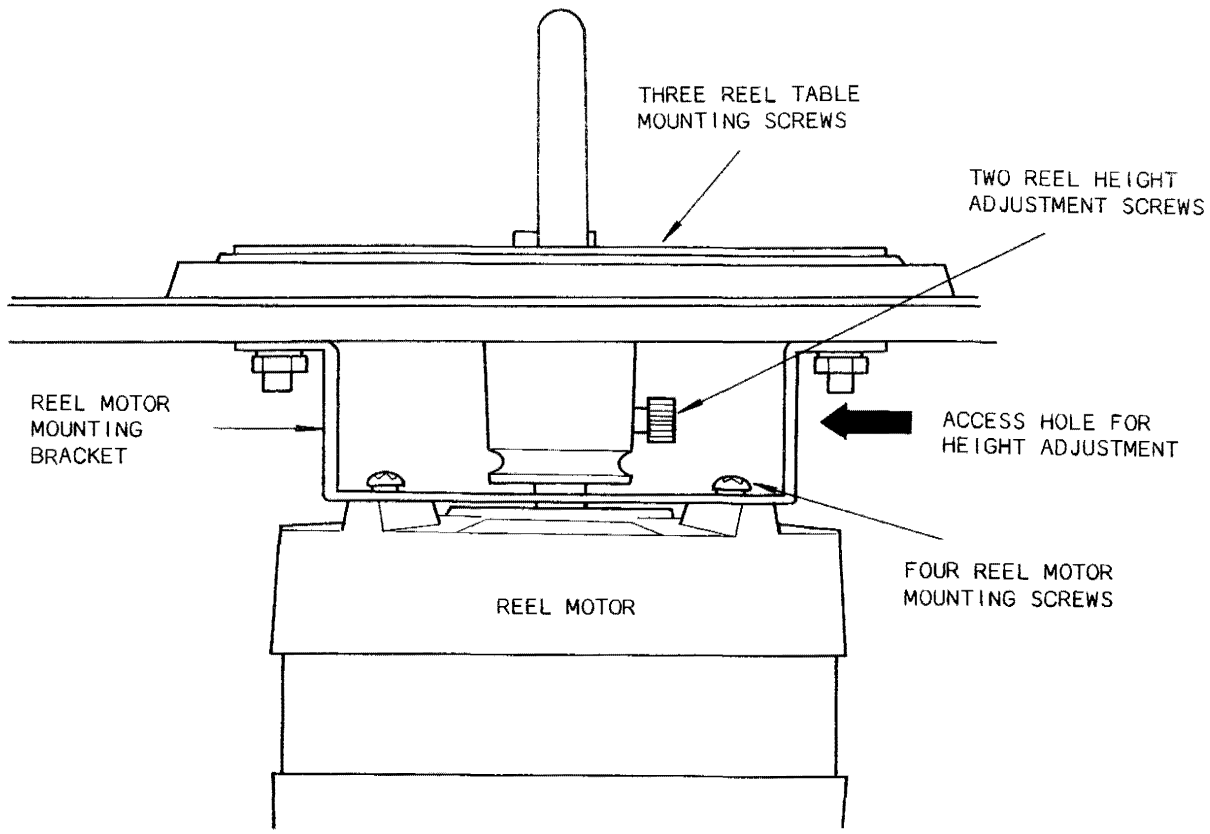


Figure 8-1 Reel Motor Mounting

8-1-(2) REEL MOTOR REPLACEMENT

To replace the supply or takeup motor proceed as follows:

1. Loosen the two hex socket head screws on the reel shaft holder (Figure 8-1) and remove the reel table and holder.

2. Tag and unsolder the motor leads attached to the printed circuit board.

3. Remove the four motor mounting cross-recessed screws, accessible from the front of the transport.

4. Remove the brake assembly and the brake drum by removing the four brake assembly mounting screws and two hex socket head screws on the bottom of the reel motor as shown in Figure 8-2.

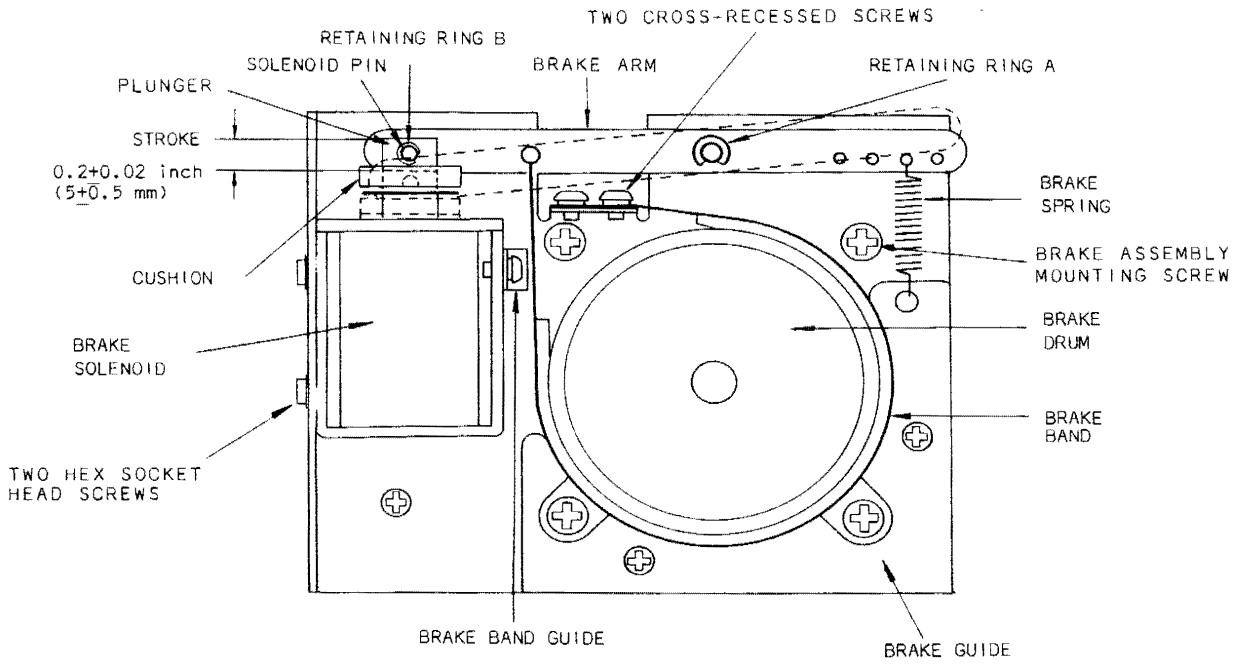


Figure 8-2 Brake Assembly

8-1-(3) BRAKE ARM ASSEMBLY AND BRAKE SOLENOID REPLACEMENT

When a new brake arm assembly or new brake solenoid is installed (Figure 8-2), it is necessary to position the brake guide and/or brake solenoid to ensure uniform brake band clearance around the brake drum when the solenoid is energized.
Also, the brake solenoid plunger must bottom in the solenoid housing when the solenoid is energized.
When the solenoid is de-energized, the brake band should uniformly contact the drum surface.
After installation, perform the brake adjustment procedure in Section 6 of this manual.
After completion of the adjustments, place the recorder in the play mode for 30 minutes.
Then press the STOP and PLAY pushbuttons alternately to ensure that the solenoid bottoms when it is hot.

To replace the brake arm assembly, proceed as follows:
The brake arm assembly consists of the brake arm and the brake band.

1. Remove the retaining rings "A" and "B", and remove the brake spring.

2. Remove the two cross-recessed screws, and replace the brake arm assembly.

To replace the brake solenoid, proceed as follows:

1. Remove the brake spring.

2. Remove retaining ring B on the solenoid pin and remove the solenoid pin.

3. Remove the solenoid housing and plunger by removing the two hex socket head screws.

4. Install a new solenoid housing and plunger and adjust the solenoid for a 5 ± 0.5mm (0.2 +0.02 inch) plunger stroke by loosing the two hex socket head screws.

8-2 POWER TRANSFORMER REPLACEMENT

To replace the power transformer (refer to EXPLODED VIEW), proceed as follows:

1. Tag transformer leads and disconnect the three transformer connectors.

2. Remove the four M4 nuts that secure the transformer to the transport.

3. Install a new transformer in the reverse order of removal, and connect the three transformer connectors.

8-3 CAPSTAN MOTOR REPLACEMENT

The capstan motor should be replaced along with the servo control printed circuit board assembly.
To replace the capstan motor proceed as follows:

1. Remove the pinch roller, the head housing cover, the head front escutcheon as described in Section 5.
   Remove the dust cap from the capstan by turning the dust cap counterclockwise.

2. Remove the connector on the servo control printed circuit board assembly located above the capstan.

3. Remove the servo control printed circuit board assembly and its mounting plate by turning the two M4 cross-recessed screws (D) and the four cross-recessed screws (B) on the mounting plate.

4. Remove the capstan mounting plate and capstan motor by removing the four M4 cross-recessed screws (A) on the mounting plate.

5. Remove the capstan motor by removing the three M4 cross-recessed screws (C) on the mounting plate and install a new capstan motor assembly in the reverse order of removal.

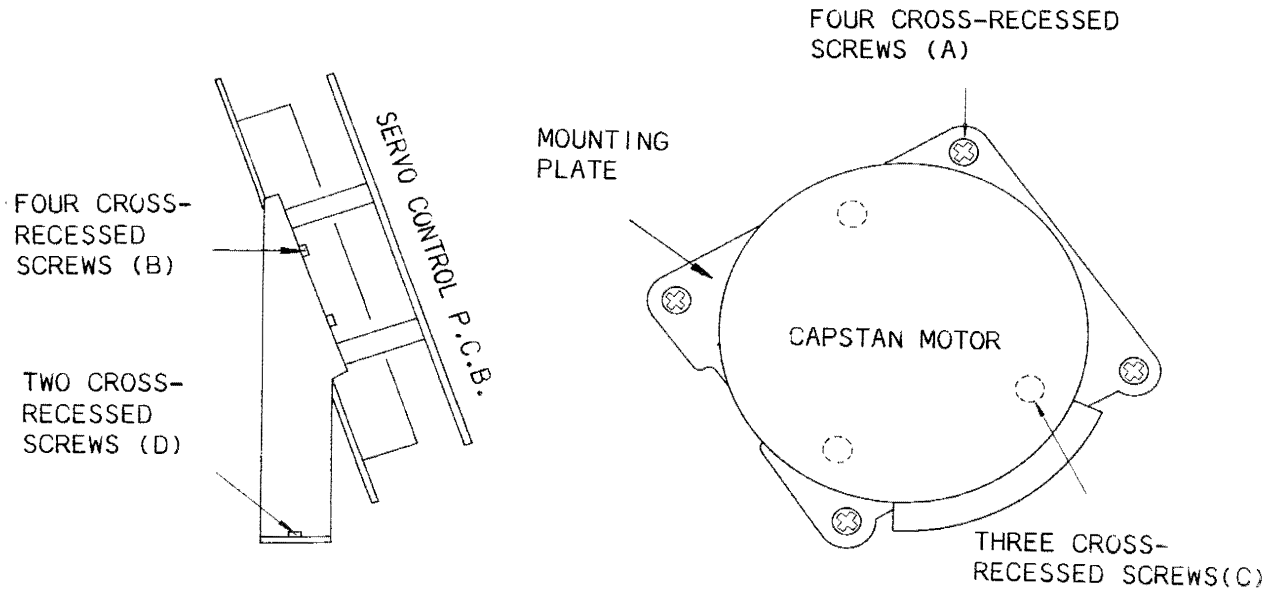


Figure 8-3 Location of DC Servo Capstan Motor

8-4 PINCH ROLLER REPLACEMENT

To replace the pinch roller assembly proceed as follows:

1. Remove the pinch roller cap by removing the flat head socket cap screw.

2. Install a new pinch roller, and pinch roller cap in the reverse order.

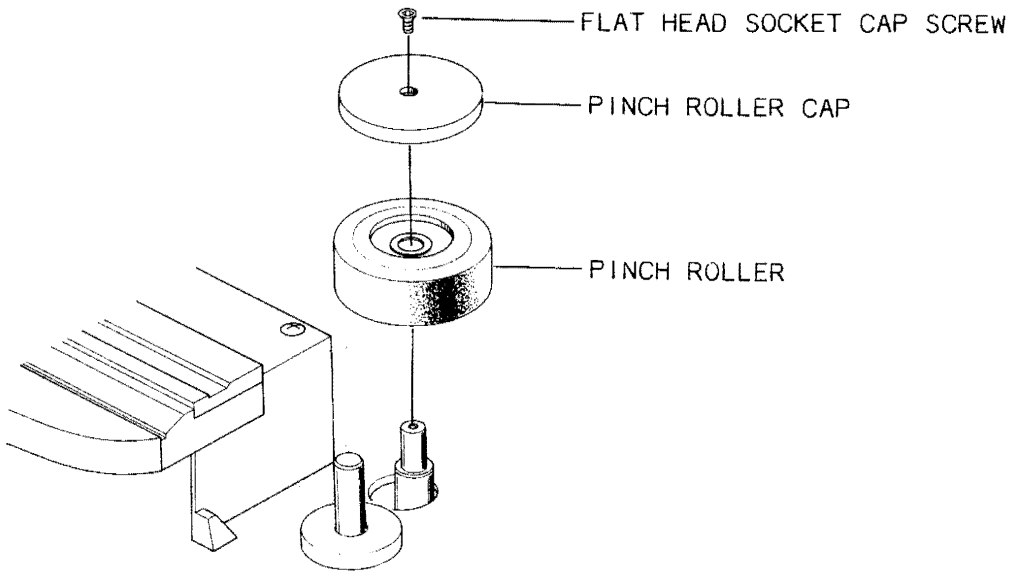


Figure 8-4 Pinch Roller Removal

8-5 HEAD ASSEMBLY REPLACEMENT

This section provides a description of the head assembly, the procedure for changing the head stack, and the adjustment procedure for adjusting head azimuth (tilt), head height, head zenith (perpendicularity), and tape wrap (racking).
These adjustments are required whenever a head stack is replaced.

8-5-(1) DESCRIPTION

The head assembly is mounted on three tape-guide posts and secured in place by the three screws labeled "M" in Figure 8-5.
Each head stack is secured to a bracket by the screws labeled "W".
Each bracket is suspended from the head base by the three spring-loaded screw labeled "H", "A", and "T".
Screws labeled "W" are used to adjust tape wrap.
Screws labeled "H", "A", and "T" are used to adjust height, azimuth, and zenith.
A head stack may be removed and re-lapped (face resurfaced) if the amount of wear is small and only an indication of poor head-to-tape contact is evident.

Poor contact is the result of improper adjustment and is evidenced by the loss of high frequency response of the record or reproduce head, difficulty in achieving bias peak (record head), and insufficient erase head erasure.

8-5-(2) HEAD STACK REPLACEMENT

To change a head stack, proceed as follows:

1. Lift the head cover and disconnect the ac power cord.

2. Remove the head assembly by removing tne three screws labeled "M" and pull the two head connectors out.

3. Tag and unsolder the leads at the head connectors of the head assembly.

4. Remove the head stack by removing tne three screws labeled "A", "T", and "H".

5. Install a new head stack by tightening the spring-loaded screws up and resolder the leads.

6. Paint the head face with a soft crayon, run the tape for about ten seconds, and check the crayon rubbed away by the tape.
   If tape wrap is incorrect, adjust the wrap by loosening the screws labeled "W" as shown in Figure 8-5.

Head alignment and the following adjustments are necessary whenever the head is replaced.

1. For reproduce head replacement.
   A. Reproduce equalization adjustment.
   B. SRL adjustment.

2. For record head replacement
   A. Record bias adjustment.
   B. Overall frequency response adjustment.
   C. Record level adjustment.

3. For erase head replacement.
   A. Record bias adjustment.

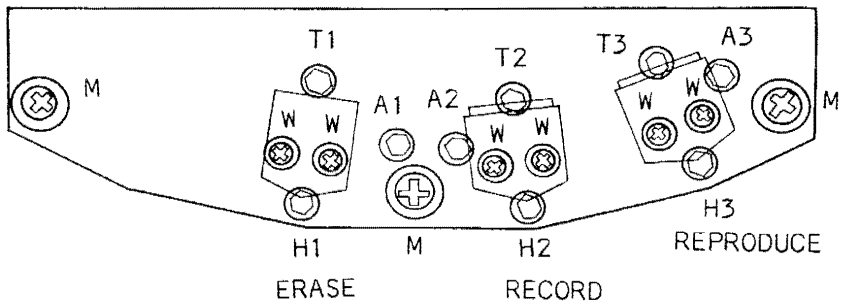
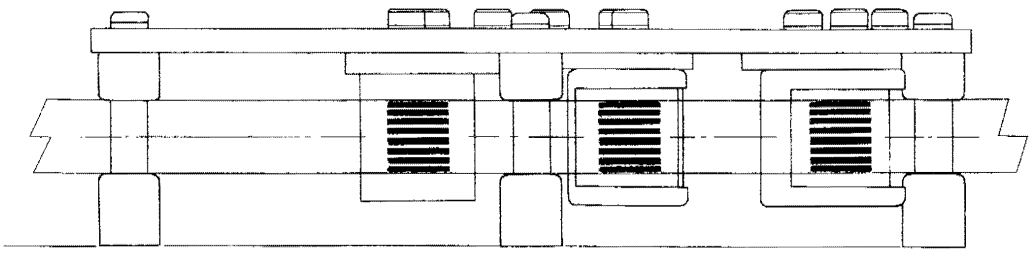
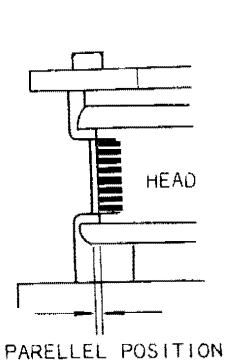
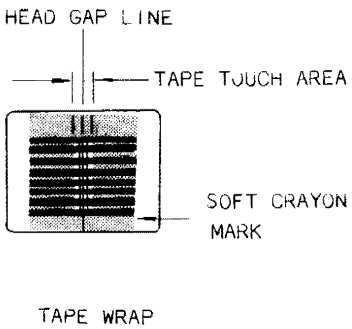


Figure 8-5 Head Assembly







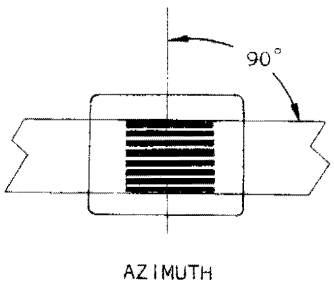


Figure 8-6 Head Alignment

8-5-(3) RECORD AND REPRODUCE HEAD ADJUSTMENT

Follow the procedure for reproduce system adjustment given in Section 7 of this manual.
For the final adjustment of a record head stack, the height and azimuth adjustment may be accomplished in the same manner as for a reproduce head stack, by playing back an alignment tape with the equipment in the selective reproduction mode.

8-5-(4) ERASE HEAD ALIGNMENT

Erase head azimuth is not critical, however wrap angle and head height relative to the record head are important to achieve maximum efficiency.
Poor erasure is often caused by misalignment of the erase head.
Before making any attempt to adjust the erase head stack, an entire electronic alignment procedure (reproduce, record, and bias alignment) should be performed so that the record and reproduce head height are correct, the SRL adjustment is correct, and bias and record levels are properly calibrated.
A temporary erase head adjustment can be accomplished by using a headset or a speaker/amplifier.
However, for precise alignment, a wave analyzer should be used.
Proceed as follows:

1. Follow the procedure for erasure test steps 1 through 6 given in Section 7-4-(4).

2. Observe the reading on the wave analyzer and turn screw "H" (Figure 8-5) 1/4 turn clockwise.
   If the reading decreases, turn the screws "A" and "T" 1/4 turn clockwise.
   If the reading increases when "H" is turned 1/4 turn clockwise, turn "H" counterclockwise past the original setting to 1/4 turn counterclockwise.
   If the reading decreases, turn screws "A" and "T" counterclockwise by the same amount.

3. Repeat step 2 in small increments to achieve a minimum reading on the wave analyzer.
   Typical amount of erasure should be 70 dB or better.

   NOTE: After screw "H" is turned, be sure to turn screws "A" and "T" the same amount.

4. If adjustment of the erase head height alone does not achieve satisfactory erasure, set screws "H", "A", and "T" for a minimum reading on the wave analyzer.
   Note that there are two gaps on the face of the erase head.
   The trailing gap has the best effect on erasure and must have good contact with the tape.
   Loosen screws "W" slightly and rotate the erase head stack for a minimum reading on the wave analyzer.
   Tighten screws "W".

SECTION 9
TROUBLESHOOTING

9-1 PRELIMINARY PROCEDURES

If a problem should occur with the tape recorder, check that the following items are correct before proceeding.
As an aid in troubleshooting, refer to the following section and the schematic diagrams and parts lists included in this manual.

1. Head stacks are cleaned and demagnetized.
2. Head azimuth and height are correct.
3. Record bias has been adjusted properly.
4. Recommended tape has been used.
5. Input and output connectors are correctly wired.
6. AC line voltage tap is set to the correct value.
7. All operational switches have been correctly set.
8. Adjustment procedures have been correctly made using accurate test equipment.

9-2 TROUBLESHOOTING HINTS

Some of the more common problems, points to confirm and possible causes are listed in Table 9-1 and 9-2.
When a problem occurs, first, confirm certain points, and if the problem does not resolve itself, inspect other possible causes.

Table 9-1 Troubleshooting Hints for Amplifiers

Item	Symptom	Items to be checked	Defective parts
1	Record does not function.	Examine the READY/SAFE switch, input & output connector, head cords and consult operational procedures.	RL301 or Q301 on PB-15B or PB-15J is defective.
2	SEL/REP does not function.	Examine the MONITOR SELECT switch position, and consult operational procedures.	RL301 or Q301 on PB-15B or PB-15J is defective.
3	Bias level is not high enough.	Examine bias level, and resonanse peak.	Q209,210,211 or 212 on PB-15B or PB-15J is defective.
4	Output level is not high enough.	Examine the LINE OUTPUT LEVEL switch position.	IC103 or 104 on PB-15B PB-15J is defective.
5	TEST OSC does not function.	Examine the MONITOR SELECT and TEST OSC switch position.	IC501 or 502 on PB-45G is defective.

Table 9-2 Troubleshooting Hints for Transport

Item	Symptom	Items to be checked	Defective parts
1	Transport does not function.	Examine the POWER switch, power cord, fuses, power receptacle.	IC4 on CB-317 or IC9 on PB-45N is defective.

Item	Symptom	Items to be checked	Defective parts
2	NO PLAY, F.FWD or RWD mode function.	Examine tape threading tension arm positions and EDIT switch.	IC1, Q4,6,7,8,9,10,11 14,15,16 or 18 on PB-45N is defective.
3	Record does not function or Record indicator does not light up.	Examine operational procedures.	IC1 or Q2 on PB-45N is defective.
4	EDIT does not function or EDIT indicator does not light up.	Examine operational procedures.	IC1 or 33 on PB-45N is defective.
5	Timer does not function.	Examine tape threading and tension arm positions.	IC2,3,32 or 33 on PB-45N is defective. Photo interrupter on PB-82M is defective.
6	Pinch roller does not function.	Examine looseness of nuts.	Q11, 14 or 18 on PB-45N is defective.
7	Brake does not function.	Examine the stroke of the Brake solenoid and smooth motion of the Brake arm.	Q4, 11, 15 or 16 on PB-45N is defective.
8	Capstan does not rotate or speed is incorrect.	Examine the connector of capstan motor P.C. Board, tension arm positions, pitch control knob position, and sped switch position.	Q5 on PB-45N is defective. Capstan motor or capstan motor P.C.Board is defective.

SECTION 10
PARTS LISTS AND SCHEMATICS

When ordering parts, the part number must be specified.
Components which do not have part numbers should be specified by a reference number.
Concerning components on the printed circuit boards, those which have part numbers should be specified by their respective part number, and those which do not have part numbers should be specified either by their assembly name or reference numbers.

NOTE

The part numbers in parenthesis are included in the assembly numbers indicated in the "Notes" next to those "Parts No.", therefore, those parts must be specified by the assembly numbers.

10-1 SAFETY COMPONENTS

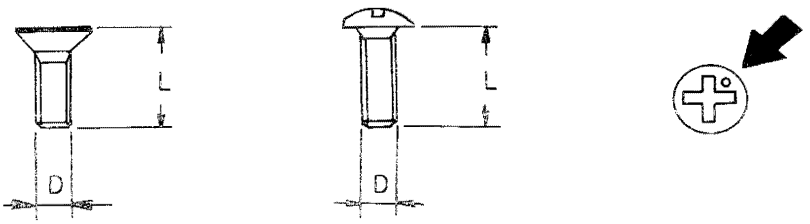
For safe operation, components specified by the symbol ⚠, in the circuit diagram, must not be replaced with ones of a different type. These safety components are also listed on Table 10-1.

Table 10-1 Safety Component

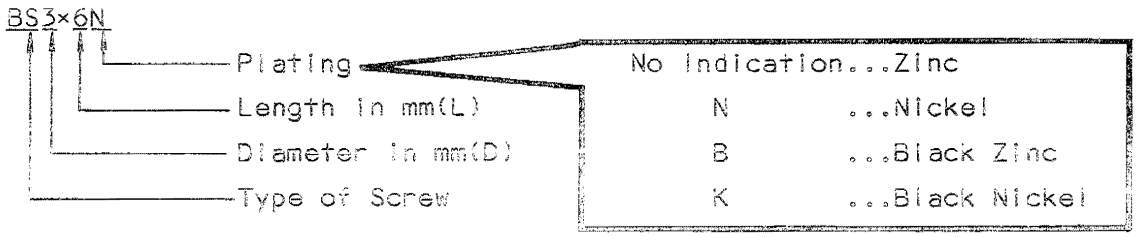
Ref. No.	Description	Part No.	Assembly	Notes
2-10	Transformer, Power	TF11060	CHASSIS Ass'y	
2-16	Fuse, 5A, Φ 5.2	FH7F050	"	Control P.C. Board Ass'y (PB-45N)
	Fuse, 3A, Φ 5.2	FH7F030	"	
	Fuse, 2A, Φ 5.2	FH7F020	"	
	Relay, Reel Motor switching	RY1DC029	"	
	Resistor, 18 ohm, 3W	R8DJ180M	"	
	11 ohm, 3W	R8DJ110M	"	
	5.1 ohm, 3W	R8DJ5R1M	"	
	0.33 ohm, 3W	R8DJR33M	"	
	100 ohm, 5W	R93-002K	"	
	Spark Killer 0.1 μF+120 ohm (250 WV)	CZ20001W	"	
	Connector, 3P } pair, MB	CN403031	"	
	" 3P }	CN403075	"	
	" 6P } pair, MA and	CN406035	"	
	" 6P } MC	CN406077	"	
4-7	Capacitor, Reel Motor, 9 μF (250 WV)	PB-76Z	Reel Ass'y	
	P.C. Board, Capacitor			
6-10	P.C. Board Ass'y, Power Switch	PB-76Q	Control Switch Ass'y	
	Fuse, Power Supply, 3A	FH7E030	"	
	Spark Killer, 0.033 μF+120 ohm (250 WV)	CZ20004W	"	
	Spark Killer, 0.1 μF+120 ohm (250 WV)	CZ20001W	"	
	Switch, Push, POWER SPEED REEL	WH12008	"	
8-2	Receptacle, A.C.Inlet, Power	CN603012	Connector Panel Ass'y	
	Power Cord	PZ9D003		

10-2 ASSEMBLY HARDWARE CODING

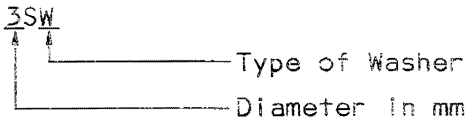
All screws conform to ISO standard, and have a cross-recessed head, unless otherwise noted.
ISO screws have a point inscribed in the head as in the following figure.



EXAMPLE OF SCREW



EXAMPLE OF WASHER



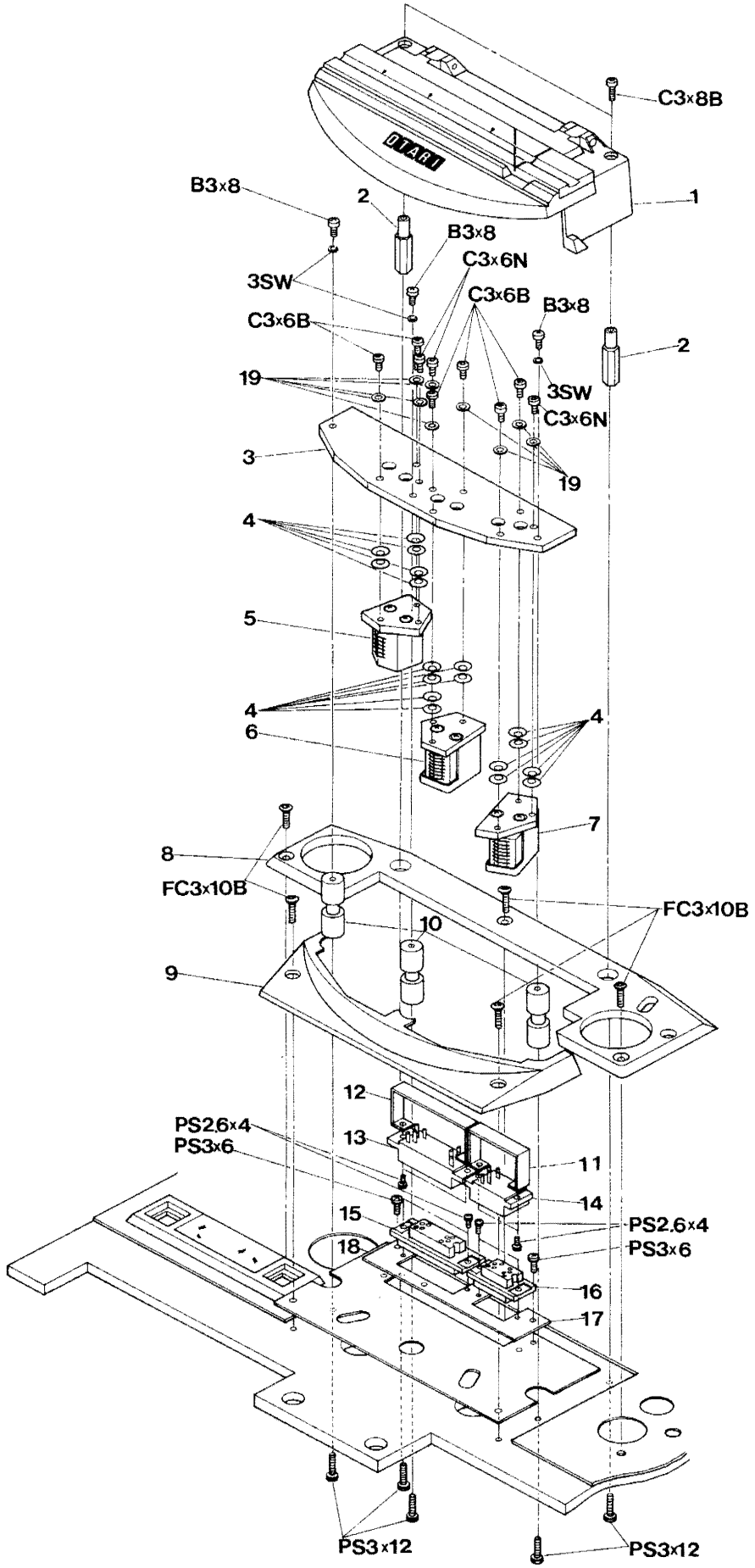
No.	Code	Full Name
1	BS	Bind SEMS Screw
2	PS	Pan SEMS Screw
3	TS	Triple Screw
4	B	Binding Head Screw
5	P	Pan Head Screw
6	F	Flat Countersunk Head Screw
7	O	Oval Countersunk Head Screw
8	H	Hex Head Bolt
9	T	Truss Head Screw

No.	Code	Full Name
10	C	Hex Socket Head Screw
11	S	Hex Socket Headless Set Screw
12	W	Flat Washer
13	SW	Spring Washer
14	N	Hex Nut
15	LW	Lock Washer
16	K	Knop Washer
17	FW	Fiber Washer
18	FC	Flat Head Socket Cap Screw
19	BC	Button Head Socket Cap Screw

10-3 PARTS LISTS AND EXPLODED VIEW

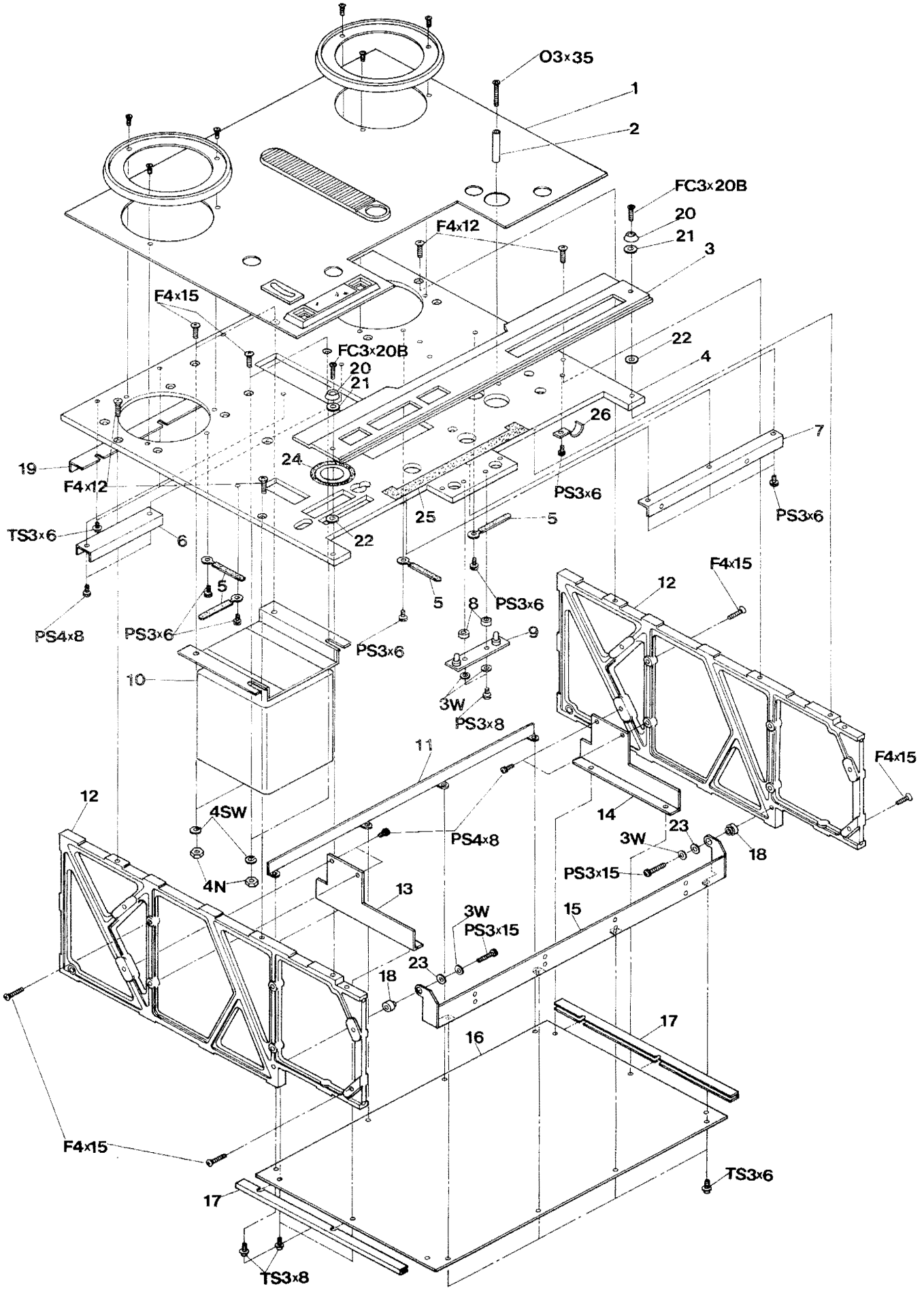
PARTS LIST 1. HEAD ASSEMBLY

Ref. No.	Description	Part No.	Notes
1-1	Head Housing Ass'y	KH-2H-A	
1-2	Stud, Head Housing Ass'y	KH4Y005	
1-3	Plate, Head Mount Base	KH0C036	
1-4	Washer, Conical Spring	PZ1E001	
1-5	Head, Erase, 8T/8CH	GH2E009B	
1-6	Head, Record, 8T/8CH	GH2R010B	
1-7	Head, Reproduce, 8T/8CH	GH2P011B	
1-8	Plate, Trim, Head Housing Ass'y	KH0F038	
1-9	Cover, Front, Head Housing Ass'y	KH0F037	
1-10	Guide, Head	KG2B007	
1-11	Handle B	CN7B-019	
1-12	Handle A	CN7B-018	
1-13	Connector, Male, Erase/Record Head	CN234130	
1-14	Connector, Male Reproduce Head	CN216128	
1-15	Connector, Female, Erase/Record Head	CN234129	
1-16	Connector, Female, Reproduce Head	CN216127	
1-17	Plate, Connector	KH2H001	
1-18	Plate, Shield	KH4Y001A	
1-19	Washer, Polyslider, $\phi 3 \times t0.5$	F524-3	


C3x8B
1
B3x8
2
B3x8
C3x6N
3SW
C3x6B
C3x6B
B3x8
2
19
3SW
C3x6N
3
19
4
5
4
6
4
7
8
FC3x10B
FC3x10B
10
9
12
PS2.6x4
PS3x6
13
11
14
15
PS2.6x4
18
PS3x6
16
17
PS3x12
PS3x12

PARTS LIST 2. CHASSIS ASSEMBLY

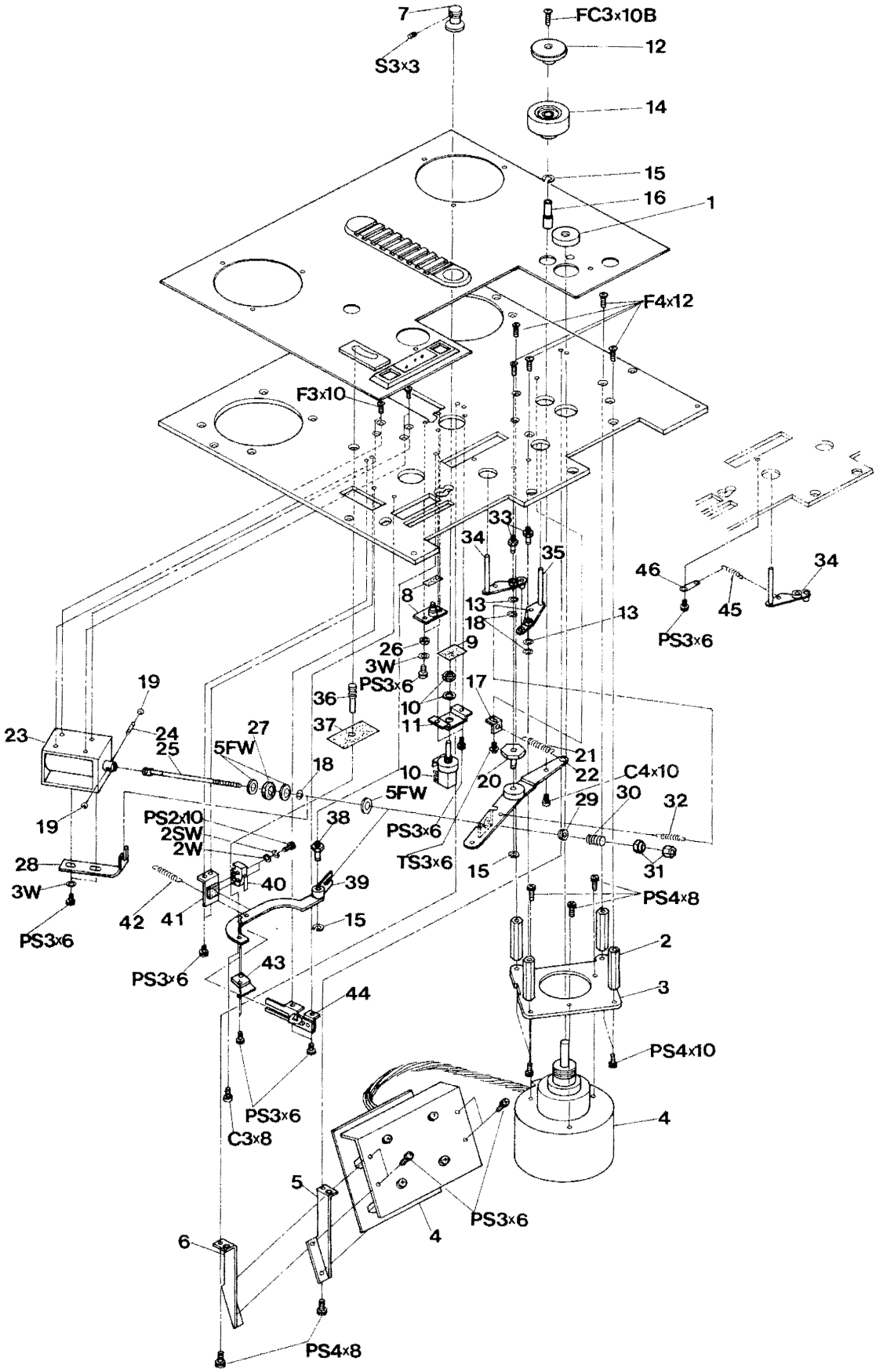
Ref. No.	Description	Part No.	Notes
2-1	Panel, Trim, Transport	(T506408)	Ass'y
	Escutcheon, Pitch Control	(KC4H005A)	T5064-A
	Escutcheon, Cue	(KR4B006A)	
	Escutcheon Ass'y, Timer	(T5064-B)	
2-2	Shaft, Tape Guide	KG6E003	
2-3	Panel, Trim, Control	T506402	
2-4	Panel, Chassis, Transport	T506401	
2-5	Clamp, Wire	PZ1G053	
2-6	Channel, Reinforce, Chassis	T506405	
2-7	Angle, Reinforce, Chassis	T506414	
2-8	Spacer, P.C. Board, LED (B)	(KZ7A823)	Ass'y
2-9	P.C. Board Ass'y, LED (B)	PB-82T	
2-10	Transformer, Power	TF11060	
2-11	Angle, Reinforce, P.C. Board	PB44S01	
2-12	Frame, Chassis, Side	T506501	
2-13	Angle, L, P.C. Board, Control	T506505	
2-14	Angle, R, P.C. Board, Control	T506506	
2-15	Angle, P.C. Board, Control	T506504	
2-16	P.C. Board Ass'y, Control	PB-45N	
2-17	Channel, Reinforce, P.C. Board	T506502	
2-18	Spacer, P.C. Board, Control	T506503	
2-19	Angle, Reinforce, Chassis	T506507	
2-20	Washer, Trim, Panel	KZ6C051	
2-21	Washer Vinyl, Panel	KZ6C011	
2-22	Washer, Panel, Control	KZ6C009	
2-23	Washer, Polyslider, $\phi 6 \times t0.25$	F523-6	
2-24	Felt, Blind, Impedance Roller	PZ1B051	
2-25	Felt, Blind, Head Ass'y	PZ1B052	
2-26	Clamp, Wire	KA3A032	


O3x35
1
2
FC3x20B
20
21
3
F4x12
F4x15
FC3x20B
20
21
22
4
26
7
19
24
F4x12
PS3x6
PS3x6
25
5
TS3x6
6
22
5
5
8
PS3x6
F4x15
12
PS4x8
PS3x6
PS3x6
9
10
3W
PS3x8
11
F4x15
12
4SW
14
23
3W
18
PS4x8
PS3x15
4N
13
3W
PS3x15
15
23
18
17
16
F4x15
TS3x6
17
TS3x8

PARTS LIST 3. CAPSTAN, PINCH ROLLER and SHIFTER ASSEMBLY

Ref. No.	Description	Part No.	Notes
3-1	Cap, Capstan Motor	KC0B011A	
3-2	Stud, Capstan Motor	KZ7B220	
3-3	Plate, Capstan Motor	KC4H001	
3-4	Motor, Capstan	MR5A008	
3-5	Bracket, R, Capstan P.C. Board	KC4V002	
3-6	Bracket, L, Capstan P.C. Board	KC4V001	
3-7	Knob, Pitch Control	KN1024A	
3-8	P.C. Board Ass'y, LED (A)	PB-82S	
3-9	Felt, Blind, Potentiometer	PZ1B037	
3-10	Potentiometer, 500 ohm	RV252009	
3-11	Bracket, Potentiometer	KC4H002	
3-12	Cap, Pinch Roller	KP0C021	
3-13	Washer, Polyslider, $\phi 6 \times t0.25$	F523-6	
3-14	Pinch Roller	KP-2B-A	
3-15	Retaining Ring, E type, $\phi 4$	F74TE20	
3-16	Shaft, Pinch Roller	KP0B014	
3-17	Angle, Spring Hook	KZ3A023	
3-18	Retaining Ring, E type, $\phi 3$	F74TE15	
3-19	Retaining Ring, E type, $\phi 2$	F74TE09	
3-20	Shaft, Roller Arm	KP4L001	
3-21	Spring, Roller Arm	GS1011	
3-22	Arm Ass'y, Pinch Roller	KP-2H-A	
3-23	Solenoid, Pinch Roller	GP1B10	
3-24	Pin, Solenoid	KZ5A003	
3-25	Rod, Solenoid	KZ6A022	
3-26	Spacer, P.C. Board Ass'y, LED (A)	KZ7A823	
3-27	Cushion, Solenoid	PZ1C021	
3-28	Limit Stop, Solenoid	KZ2A016	
3-29	Washer, Spherical, Rod	KP0G004	
3-30	Spring, Pressure, Rod	GS2003	
3-31	Nuts, M4, Rod	F517-4	
3-32	Spring, Shifter Arm B	GS1028-A	
3-33	Shaft, Shifter Arm	KR4B001	
3-34	Arm, Shifter A	KR0B005	

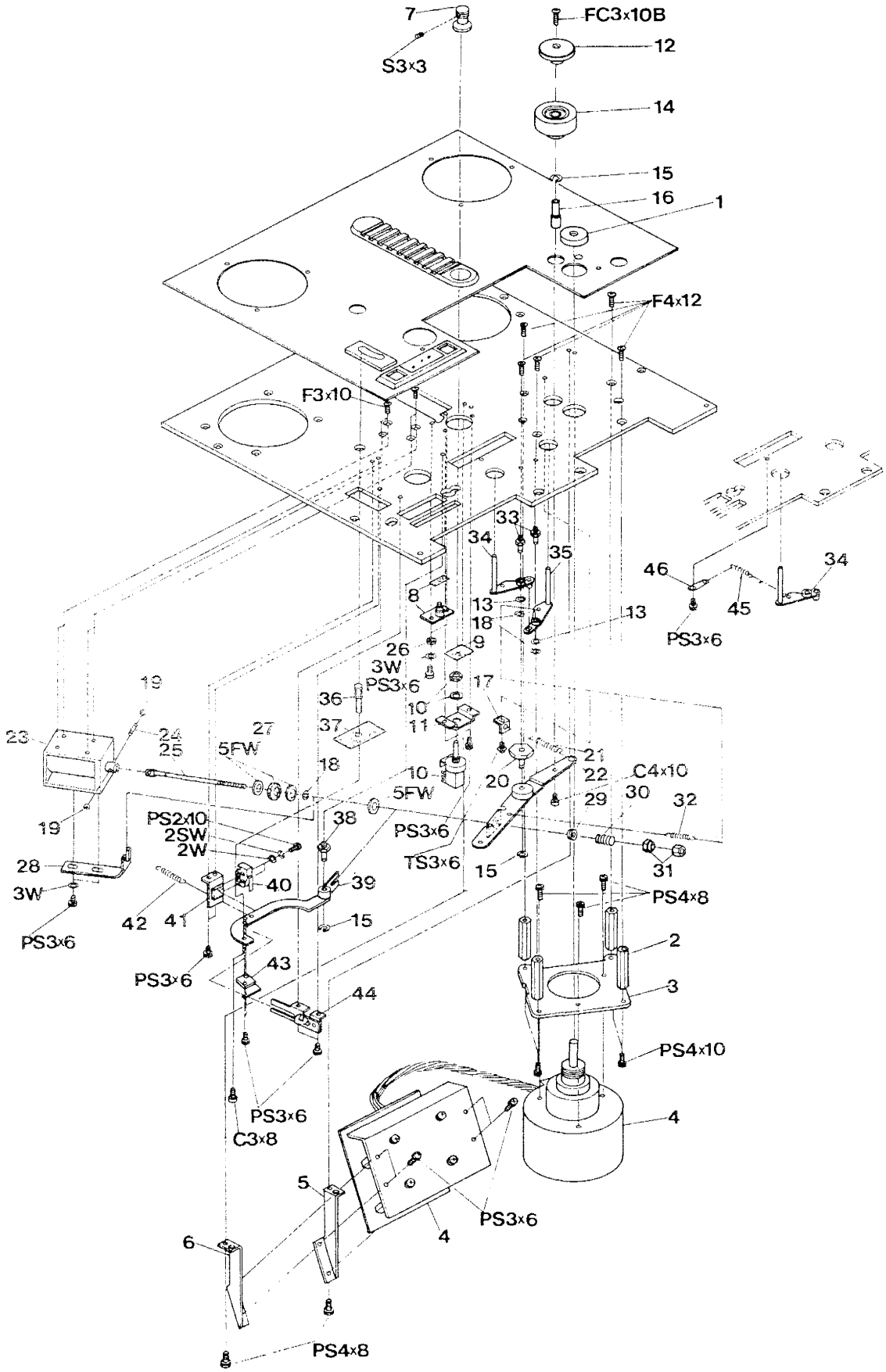
EXPLODED VIEW 3. CAPSTAN, PINCH ROLLER, and SHIFTER ASSEMBLY



3. CAPSTAN, PINCH ROLLER, and SHIFTER ASSEMBLY

Ref. No.	Description	Part No.	Notes
3-35	Arm, Shifter B	KR0B006	
3-36	Knob, Cue Arm	KR4F002A	
3-37	Felt, Blind, Cue Arm	PZ1B001	
3-38	Shaft, Cue Arm	KR4B007	
3-39	Arm, Cue	KR4C001	
3-40	Switch, Micro	WH51029	
3-41	Bracket Ass'y, Switch, Cue	KR-4K-A	
3-42	Spring, Cue Arm	GS1033	
3-43	Hook, Cue Arm	KR4C003	
3-44	Latch Ass'y, Cue Arm	KR-4C-A	
3-45	Spring, Shifter Arm	GS1087	
3-46	Lug, Spring Hook	CN7D-003	

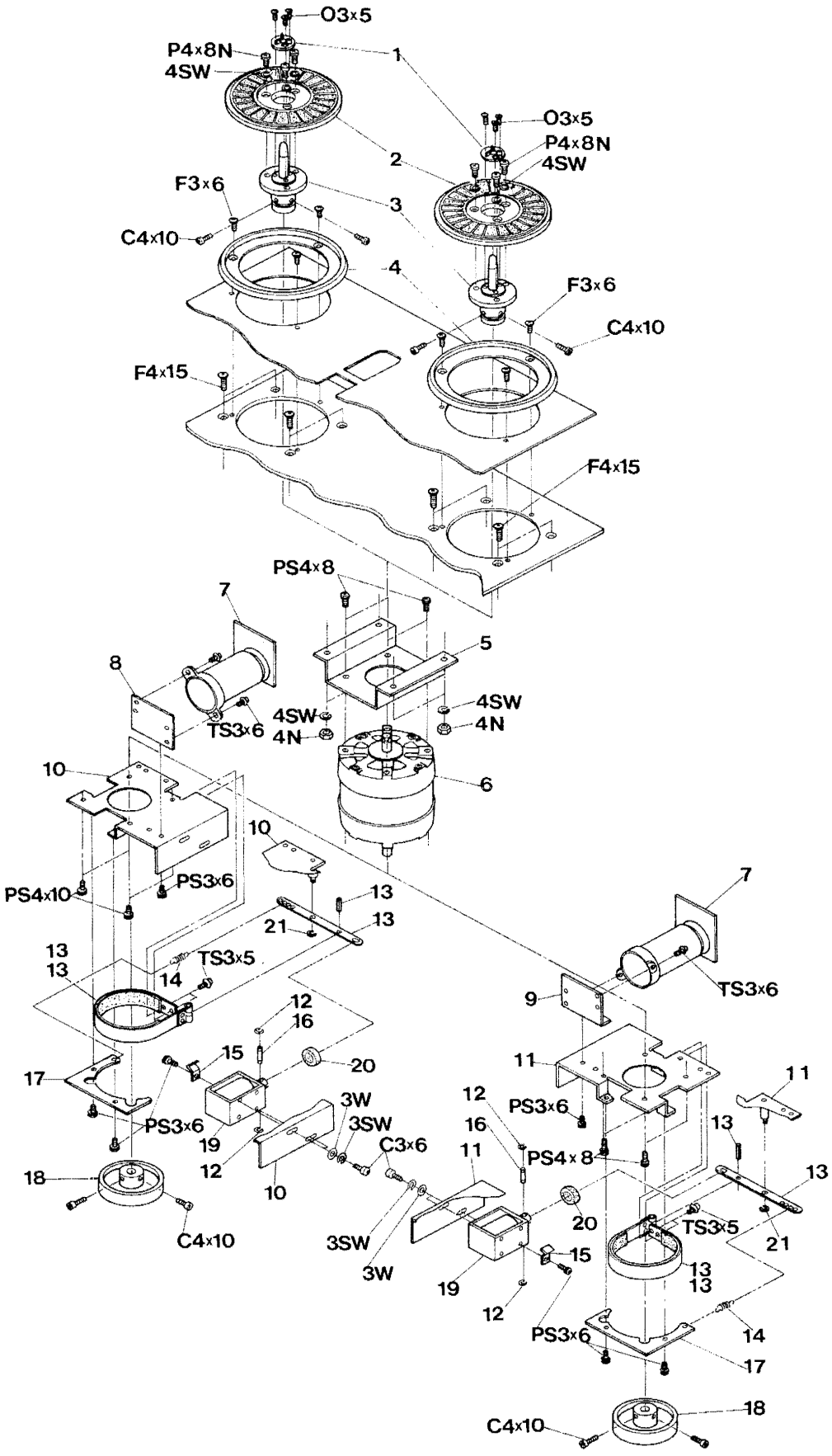
EXPLODED VIEW 3. CAPSTAN, PINCH ROLLER, and SHIFTER ASSEMBLY



PARTS LIST 4. REEL ASSEMBLY

Ref. No.	Description	Part No.	Note
4-1	Nails, Reel Drive	KW0E038	
4-2	Reel Table	KW4J002	
4-3	Drum, Reel	KW0B017	
4-4	Protector, Reel	KW0H007A	
4-5	Bracket, Reel Motor	KW0G016	
4-6	Motor, Reel	MR1C023	
4-7	Capacitor, Reel motor, 9 μF, 250WV	(CZ10047W)	Ass'y
	P.C. Board, Capacitor	(PB9A179)	PB-76Z
4-8	Bracket, L, Capacitor	KW4B003	
4-9	Bracket, R, Capacitor	KW4B004	
4-10	Bracket, L, Brake	KW0G013	
4-11	Bracket, R, Brake	KW0G012	
4-12	Retaining Ring, E Type, φ2	F74TE09	
4-13	Arm Ass'y, Brake	KW-4J-A	
4-14	Spring, Brake	GS1024	
4-15	Clamp, Brake	KZ3A047	
4-16	Pin, Solenoid, Brake	KZ5A003	
4-17	Retainer, Brake	KW4B001	
4-18	Drum, Brake	KW0A012	
4-19	Solenoid, Brake	GP1F02	
4-20	Cushion, Solenoid, Brake	PZ1B049	
4-21	Retaining Ring, E Type, φ3	F74TE15	

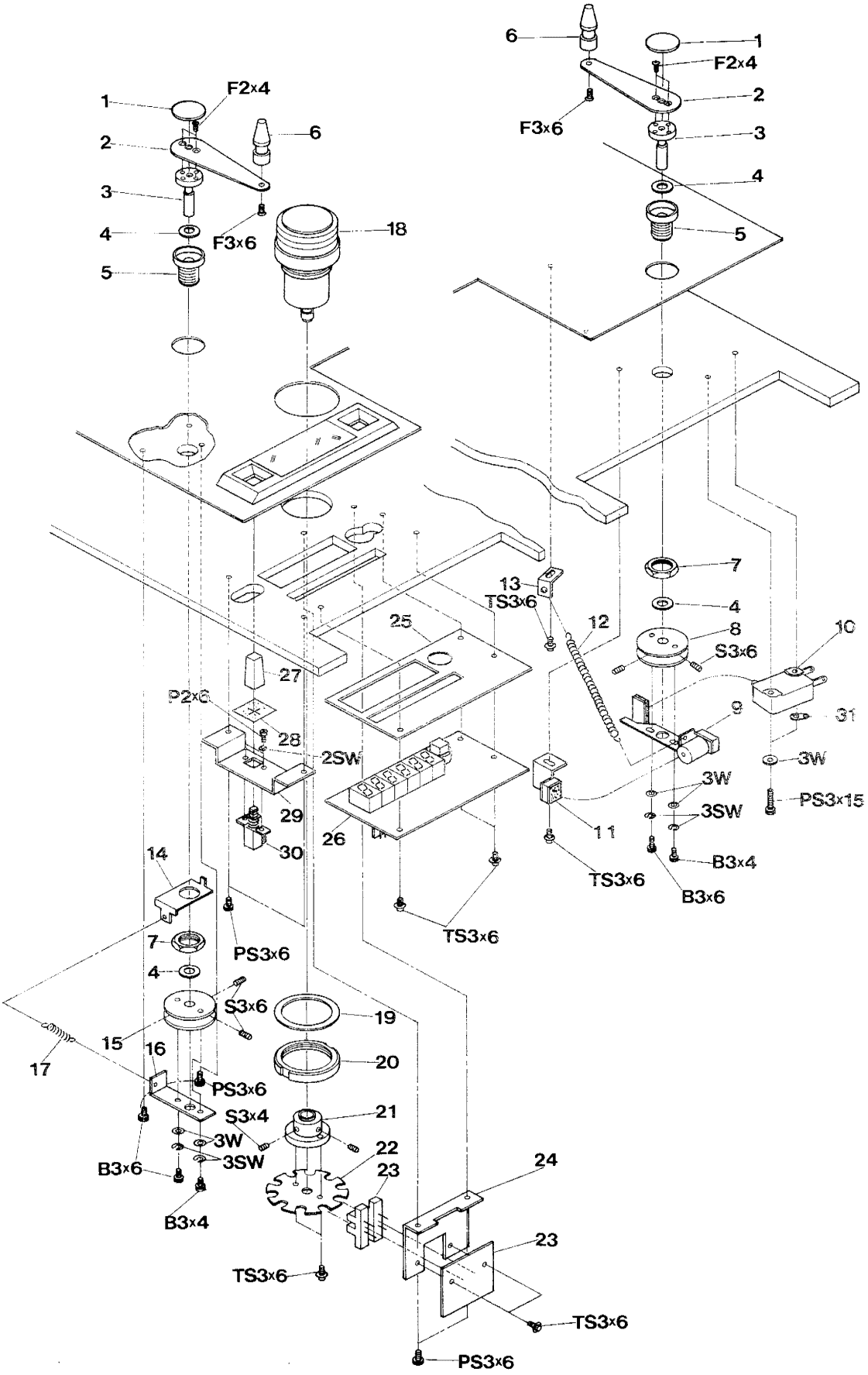
EXPLODED VIEW 4. REEL ASSEMBLY



PARTS LIST 5. TENSION ARM, IMPEDANCE ROLLER, and TIMER ASSEMBLY

Ref. No.	Description	Part No.	Notes
5-1	Cap, Arm	KA0C005	
5-2	Arm, Tension	KA0A017A	
5-3	Shaft, Arm	KA4J001	
5-4	Washer, Polyslider, $\phi 5 \times t0.5$	F524-5	
5-5	Holder, Arm	KA0B008	
5-6	Guide, Tension Arm	KG2D001	
5-7	Nut, Holder	KZ6D004	
5-8	Drum, B, Spring Retaining	KA0E005	
5-9	Arm, Ass'y, Switch	KA-4K-B	
5-10	Switch, Micro	WH51027	
5-11	Bracket Ass'y, Magnet	KA-4K-A	
5-12	Spring, Takeup, Tension Arm	GS1048	
5-13	Angle, Spring Hook	KZ3A023	
5-14	Plate, Spring Hook	KZ3A024	
5-15	Drum, A, Spring Retaining	KA0E004	
5-16	Angle, Limit Stop	KA0H004	
5-17	Spring, Supply Tension Arm	GS1032	
5-18	Roller Ass'y, Impedance	KI-2D-A	
5-19	Washer, Holder	KI0H024	
5-20	Nut, Holder	KI0H025	
5-21	Holder, Plate	KI0H026	
5-22	Plate, Optical Shield	KI4G003	
5-23	P.C. Board Ass'y, Direction	PB-82M	
5-24	Bracket, P.C. Board Ass'y	KI4G002	
5-25	Sheet, Insulation	SR5K002	
5-26	P.C. Board Ass'y, Timer	PB-82L	
5-27	Button, Push, Memory	KN2067	
5-28	Felt, Blind, Button	PZ1B053	
5-29	Bracket, Switch, Memory	SR5K001	
5-30	Switch, Push, Memory	WH12097	
5-31	Lug, Terminal	CN7D-003	

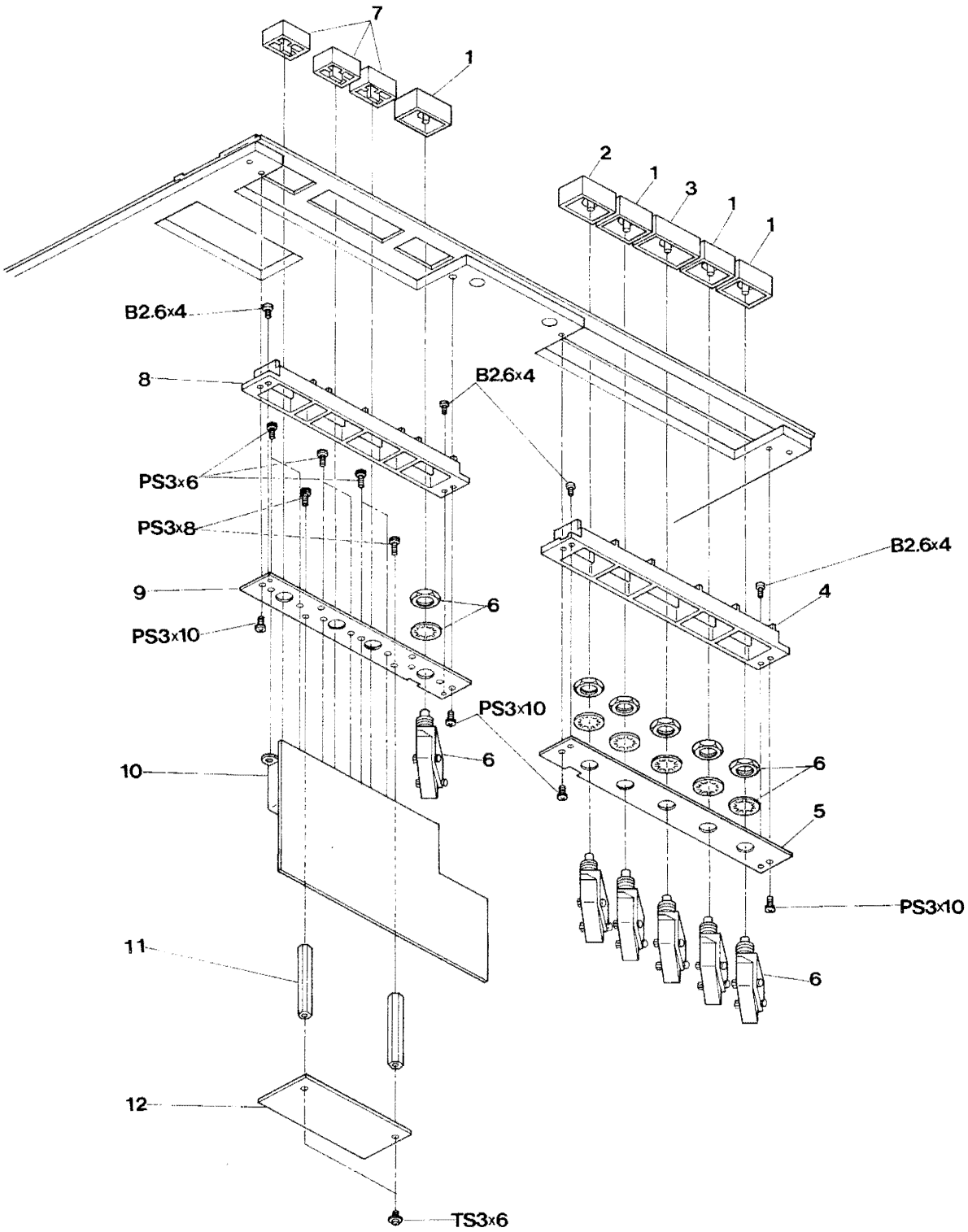
EXPLODED VIEW 5. TENSION ARM, IMPEDANCE ROLLER, and TIMER ASSEMBLY



PARTS LIST 6. CONTROL SWITCH ASSEMBLY

Ref. No.	Description	Part No.	Notes
6-1	Button, Push, A	KN2069	
	PLAY REWIND F.FWD EDIT		
6-2	Button, Push, B, REC	KN2070	
6-3	Button, Push, C, STOP	KN2071	
6-4	Protector, R, Button	CB20602	
6-5	Plate, R, Switch Base	CB20601	
6-6	Switch, Micro	WH11007	
6-7	Button, Push, POWER SPEED REEL	KN2072	
6-8	Protector, L, Button,	CB20701	
6-9	Plate, L, Switch Base	PB41E01	
6-10	P.C. Board, Ass'y, Power Switch	PB-76Q	
6-11	Stud, Power Switch P.C. Board	KZ7B106	
6-12	P.C. Board Ass'y, Aux. Switch	PB-42F	

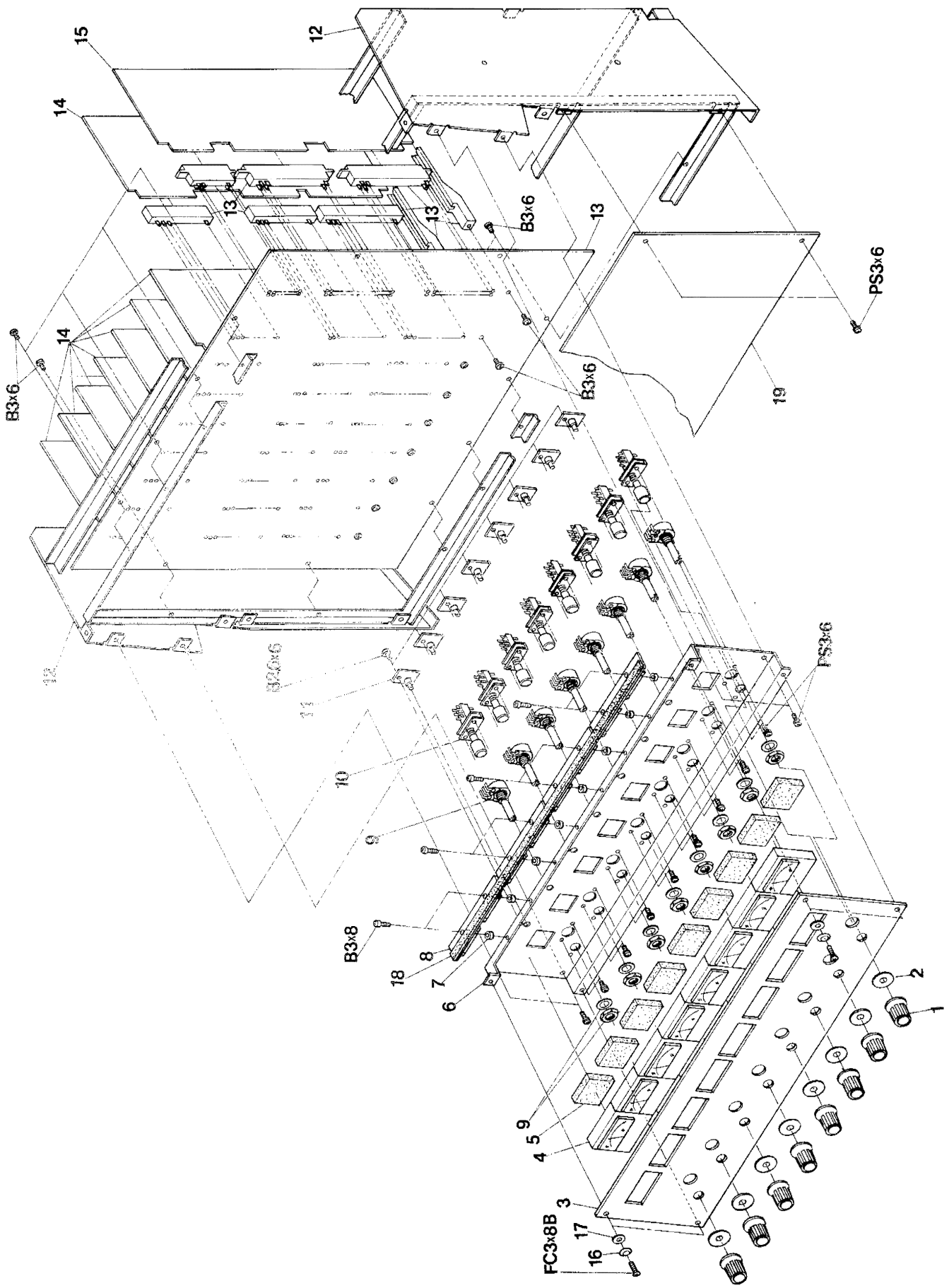
EXPLODED VIEW 6. CONTROL SWITCH ASSEMBLY



PARTS LIST 7. AMPLIFIER ASSEMBLY

Ref. No.	Description	Part No.	Notes
7-1	Knob, INPUT	KN1045B	
7-2	Washer, Knob	KZ6C052	
7-3	Panel, Trim, Amp.	A104601	
7-4	Meter, VU	ME11011	
7-5	Cushion, Meter	PZ1C051	
7-6	Panel, Chassis, Amp.	A104602	
7-7	Spacer, P.C. Board Ass'y, Lamp	KZ7A188	
7-8	Lamp, VU Meter	(LU2037)	Ass'y
	P.C. Board Ass'y, Lamp	PB-76H	
7-9	Potentiometer, 10 kohm	RV214082	
7-10	Switch, Push, SRL	WH12105G	
7-11	P.C. Board Ass'y, LED, PEAK	PB-76G	
7-12	Chassis, Amp.	A104603	
7-13	P.C. Board Ass'y, Mother	PB-76J	
7-14	P.C. Board Ass'y, REC/REP, Amp	PB-15B	NAB
		PB-15J	IEC
7-15	P.C. Board As'y, Amp. Control	PB-45G	
7-16	Washer, Trim, Panel	KZ6C051	
7-17	Washer, Vinyl, Panel	KZ6C011	
7-18	Sponge, Blind, Lamp	PZ1B019	
7-19	Plate, Shield	A104608	

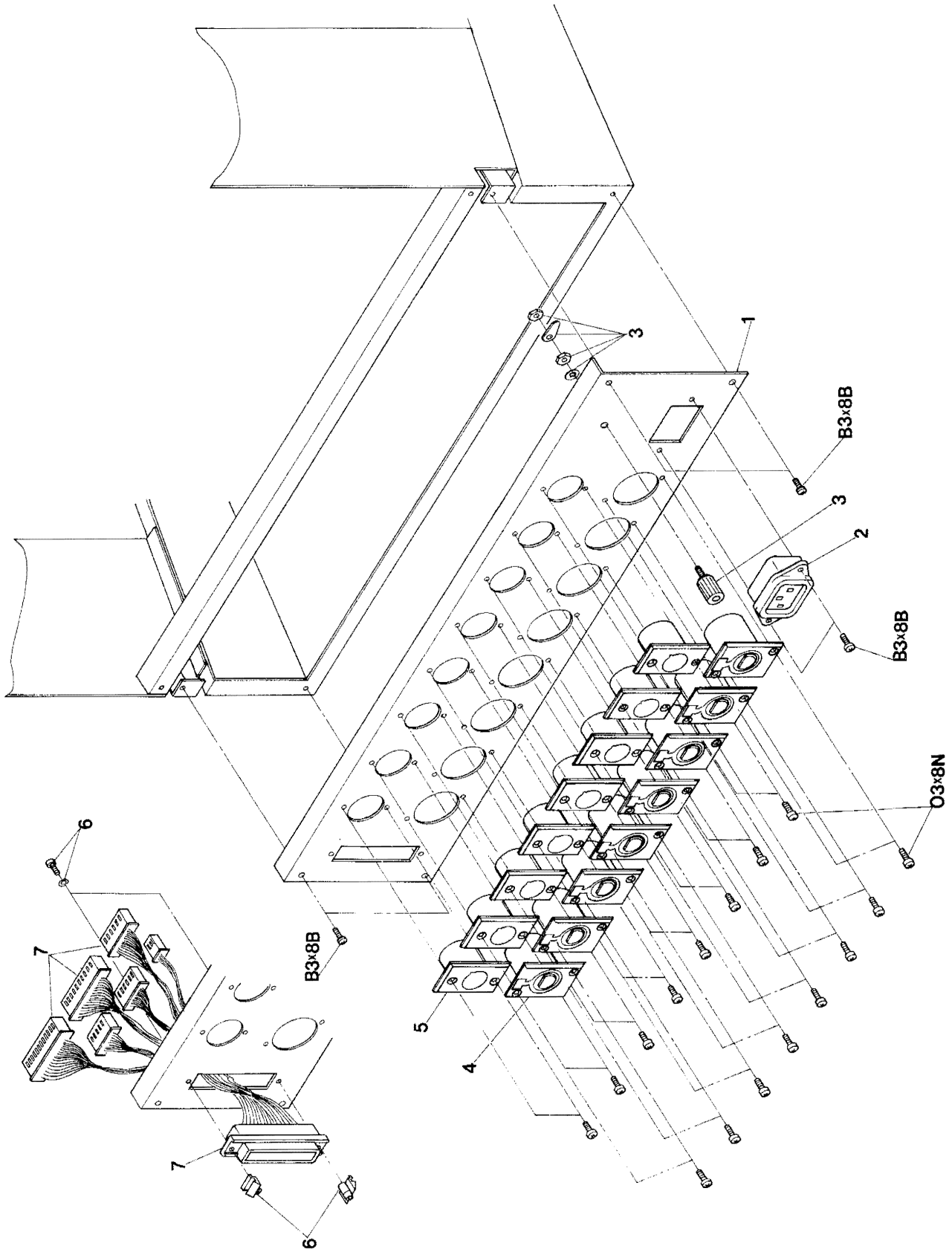
EXPLODED VIEW 7. AMPLIFIER ASSEMBLY



PARTS LIST 8. CONNECTOR PANEL ASSEMBLY

Ref. No.	Description	Part No.	Notes
8-1	Panel, Connector	CB70401	
8-2	Receptacle, A.C. Inlet, Power	CN603012	
8-3	Terminal, Ground	CN901040	
8-4	Connector, 3 Socket, XLR Type	CN103046	
8-5	Connector, 3 Pin, XLR Type	CN103045	
8-6	Clamp, Connector	CN7B-061	
8-7	Cable Ass'y, Remote Control	ZA62T0A	

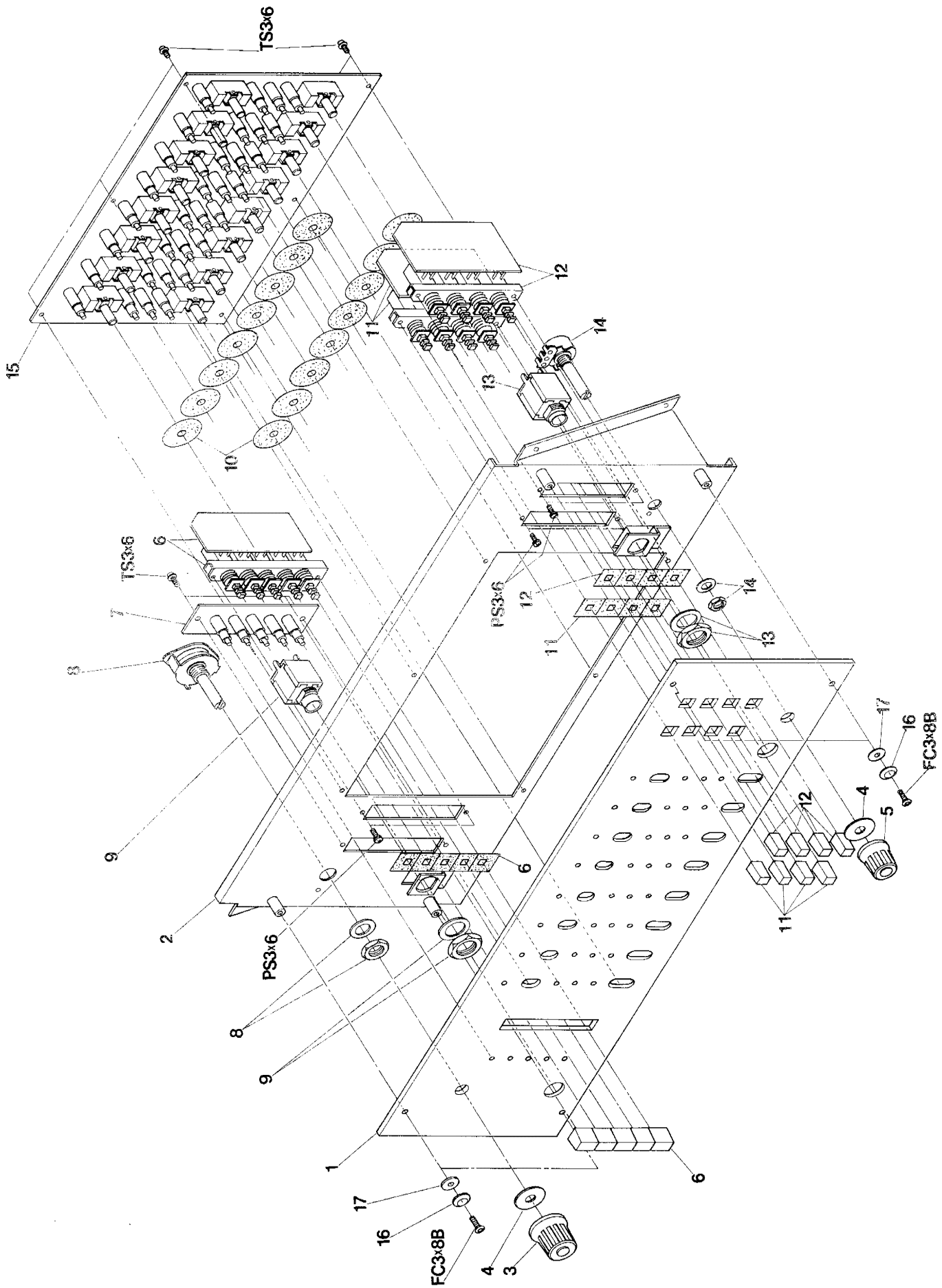
EXPLODED VIEW 8. CONNECTOR PANEL ASSEMBLY



PARTS LIST 9. AMPLIFIER CONTROL ASSEMBLY

Ref. No.	Description	Part No.	Notes
9-1	Panel, Trim, Amp. Control	CB23601	
9-2	Chassis, Amp. Control	CB23602	
9-3	Knob, TEST OSC	KN1046F	
9-4	Washer, Knob	KZ6C052	
9-5	Knob, PHONE LEVEL	KN1045D	
9-6	Button, Mode Select	(WH0B016B)	Ass'y
	Felt, Blind, Push Switch	(PZ1B053)	
	P.C. Board Ass'y, Mode Select	PB-45J	
9-7	P.C. Board Ass'y, Indicator LED	PB-76K	
9-8	Switch, Rotary, TEST OSC	WH63039	
9-9	Jack, EXT OSC	CN601142	
9-10	Felt, Blind, Lever Switch	PZ1B048	
9-11	Button, Phone Amp. B	(KN1061)	Ass'y
	Felt, Blind, Push Switch	(PZ1B053)	
	P.C. Board Ass'y, Phone Amp. B	PB-15H	
9-12	Button, Phone Amp. A	(KN1061)	Ass'y
	Felt, Blind, Push Switch	(PZ1B053)	
	P.C. Board Ass'y, Phone Amp. A	PB-15C	
9-13	Jack, PHONES	CN602144	
9-14	Potensiometer, 10 kohm	RV214082	
9-15	P.C. Board Ass'y, Mode Control	PB-45H	
9-16	Washer, Trim, Panel	KZ6C051	
9-17	Washer, Vinyl, Panel	KZ6C011	

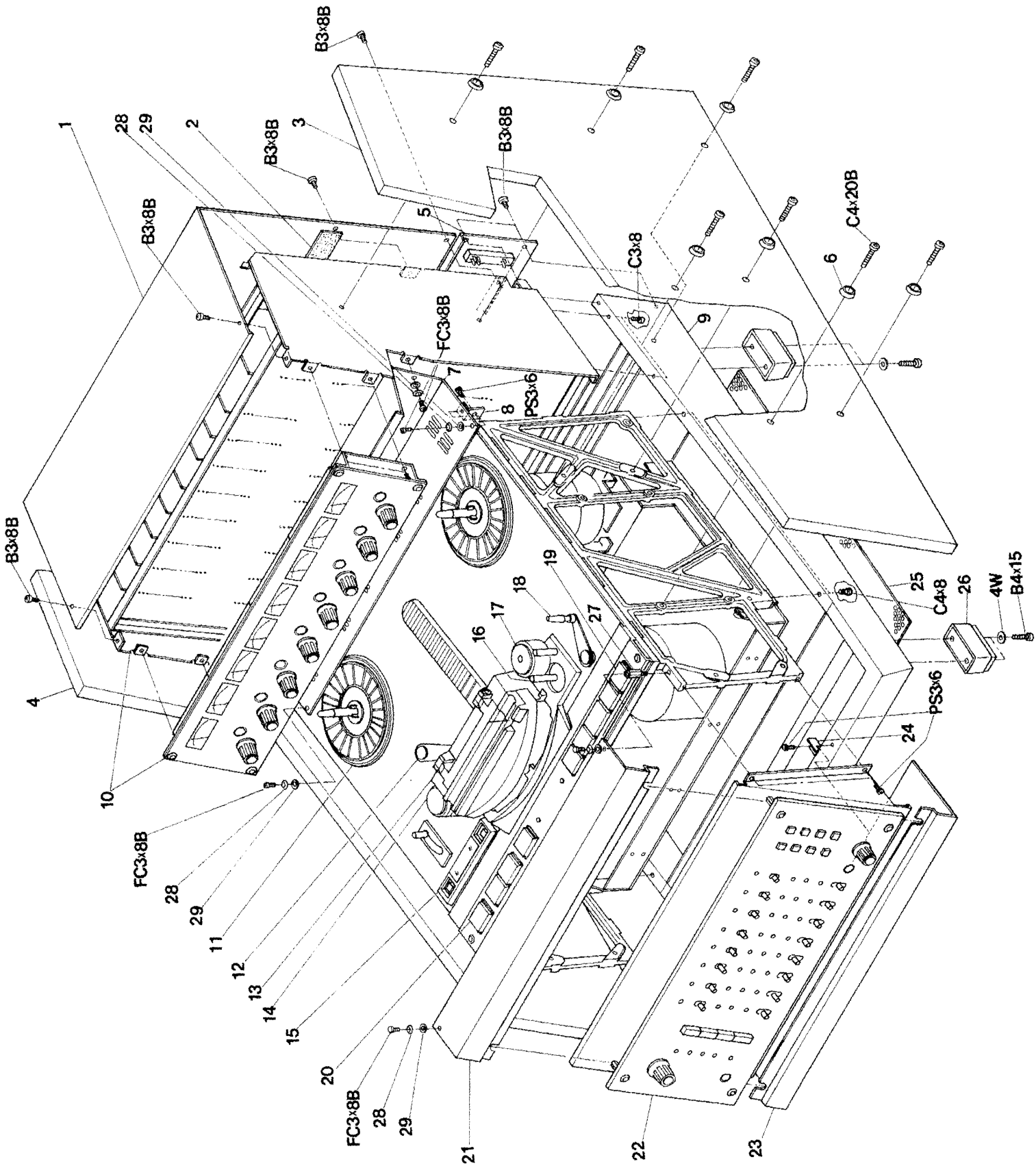
EXPLODED VIEW 9. AMPLIFIER CONTROL ASSEMBLY



PARTS LIST 10. CASE ASSEMBLY

Ref. No.	Description	Part No.	Notes
10-1	Cover, Rear	K105706	
10-2	Pad, Retainer	PZ1C052	
10-3	Board, Side, R	K105701	
10-4	Board, Side, L	K105702	
10-5	Connector Panel Ass'y	CB-704	
10-6	Washer, Trim, Panel	KZ6C028	
10-7	Cover, Ventilation	K105705	
10-8	Angle, Ventilation Cover, R	K105709	
10-8'	Angle, Ventilation Cover, L	K105710	
10-9	Frame, Bottom	K105707	
10-10	Amplifier Ass'y	A1046	
10-11	Reel Ass'y	KW-2E	
10-12	Tension Arm Ass'y A	KA-2H	
10-13	Head Ass'y	KH-2H	
10-14	Impedance Roller Ass'y	KI-2D	
10-15	Tape Timer Ass'y	SR-5K	
10-16	Capstan Ass'y	KC-4V	
10-17	Pinch Roller Ass'y	KP-2H	
10-18	Tension Arm Ass'y	KA-2I	
10-19	Control Switch Ass'y A	CB-234	
10-20	Control Switch Ass'y B	CB-238	
10-21	Cover, Front, Upper	K105703	
10-22	Amplifier Control Ass'y	CB-236	
10-23	Cover, Front, Lower	K105704	
10-24	Retainer, Front Cover	K105711	
10-25	Cover, Bottom	K105708	
10-26	Foot	CY4003	
10-27	Spacer, Front Cover	KZ7B127	
10-28	Washer, Trim, Panel	KZ6C051	
10-29	Washer, Vinyl, Panel	KZ6C011	

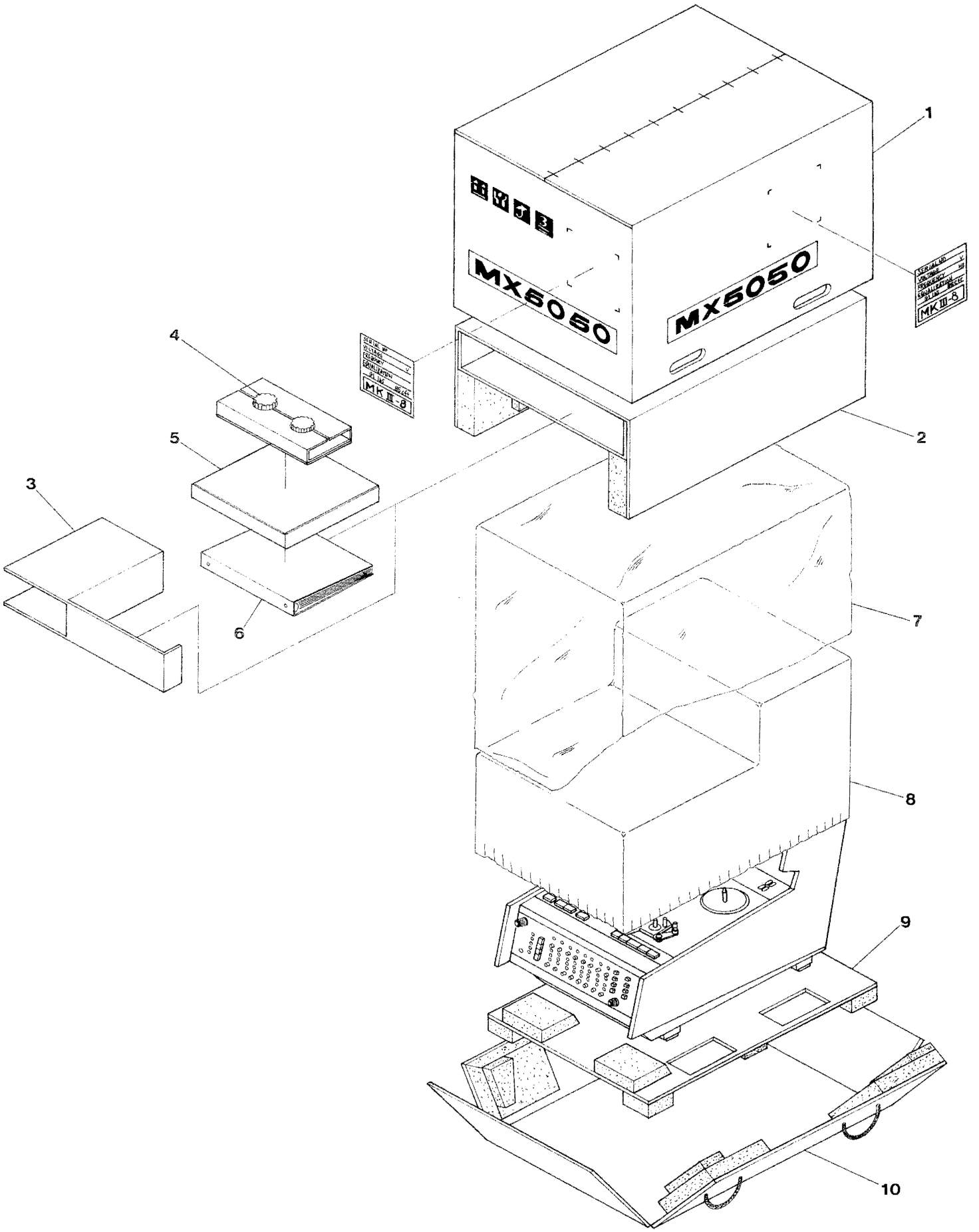
EXPLODED VIEW 10. CASE ASSEMBLY



PARTS LIST 11. PACKAGING

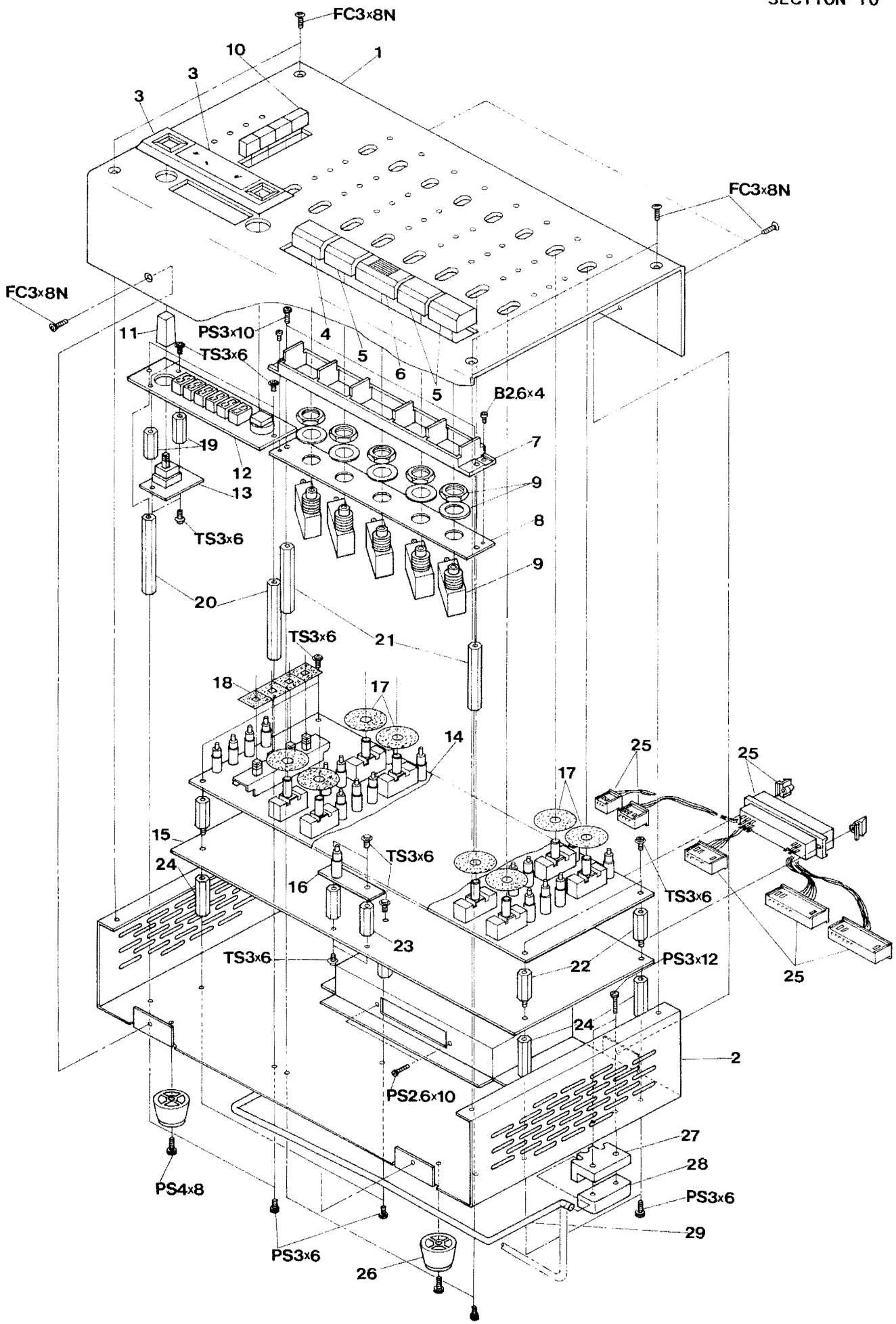
Ref. No.	Description	Part No.	Notes
11-1	Case, Packing	K705701	
11-2	Packing, Top	K705702	
11-3	Cover, Accessory Box	K705710	
11-4	Accessory, Hold Down Knob	KW0HC	
11-5	Accessory, Reel, NAB 10 1/2"	ZA-51H	
11-6	Accessory, Instruction and Maintenance Manual	0S3-033	
11-7	Cover, Polyethylene	PZ9C047	
11-8	Cover, Cloth	PZ9C034	
11-9	Packing, Bottom	K705711	
11-10	Packing, Side	K705716	

EXPLODED VIEW 11. PACKAGING



PARTS LIST 12. REMOTE CONTROL ASSEMBLY

Ref. No.	Description	Part No.	Notes
12-1	Panel, Trim	CB11001	
12-2	Chassis	CB11002	
12-3	Timer Escutcheon Ass'y	T5064-B	
12-4	Button, Push, B, REC	KN2070	
12-5	Button, Push, A, PLAY, RWD F.FWD	KN2069	
12-6	Button, Push, C, STOP	KN2071	
12-7	Protector, Button	CB20602	
12-8	Plate, Switch Base	CB20601	
12-9	Switch, Micro	WH11007	
12-10	Button, Push, Monitor Select	WH0B016B	
12-11	Button, Push, Memory	KN2067	
12-12	P.C. Board Ass'y, Tape Timer	PB-82W	
12-13	P.C. Board Ass'y, Memory Switch	PB-76W	
12-14	P.C. Board Ass'y, Mode LED	PB-45K	
12-15	P.C. Board Ass'y, Mode Switch Control	PB-45L	
12-16	P.C. Board Ass'y, Record LED	PB-76P	
12-17	Felt, Blind, Lever Switch	PZ1B048	
12-18	Felt, Blind, Push Switch	PZ1B053	
12-19	Spacer, Memory Switch P.C. Board	KZ7B133	
12-20	Spacer, Tape Timer P.C. Board	KZ7B132	
12-21	Spacer, Switch, Control	KZ7B130	
12-22	Spacer, Mode LED P.C. Board	KZ7B128	
12-23	Spacer, Record LED P.C. Board	KZ7B129	
12-24	Spacer, Mode Switch Control P.C. Board	KZ7B108	
12-25	Cable, Harness Ass'y	ZA-62U	
12-26	Foot Bottom, Front	CY4046	
12-27	Holder, Stand	CY4055	
12-28	Foot, Bottom, Rear	CY4054	
12-29	Stand, Support	CY4052	

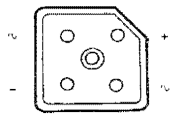

FC3x8N
10
1
3
3
FC3x8N
FC3x8N
11
PS3x10
TS3x6
4
5
6
5
B2.6x4
19
12
13
7
9
TS3x6
8
9
20
TS3x6
21
18
17
14
25
25
17
15
24
TS3x6
16
TS3x6
TS3x6
23
22
PS3x12
25
24
2
PS2.6x10
27
28
PS3x6
29
PS4x8
PS3x6
26

10-4 PIN IDENTIFICATION

The following table shows the pin identification of all diodes, LEDs transistors, and integrated circuits (ICs), used in the circuits of this equipment.

DIODES

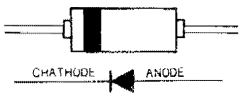
D-1



PNS2VB20
(S2VB20)
PNS4VB10
(S4VB10)
PNS5VB20
(S5VB20)

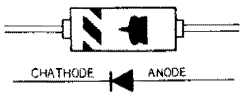
BOTTOM VIEW

D-2



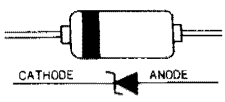
PN1S1588
(1S1588)
PN1N4448
(1N4448
or
FDH9615)

D-3



PNSM1-02
(SM-1A-02)

D-4

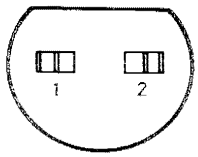


PNRD22EB
(RD22EB)
PNR6.2EB
(RD6.2EB)

LED

D-5

PNTLR124 (TLR 124)
PNTLY124 (TLY 124)
PNTLG124 (TLG 124A)
PNTLO124 (TLO 124)



1.ANODE
2.CATHODE
BOTTOM VIEW

D-6

PNTLG208
(TLG208)



1.ANODE
2.CATHODE

D-7

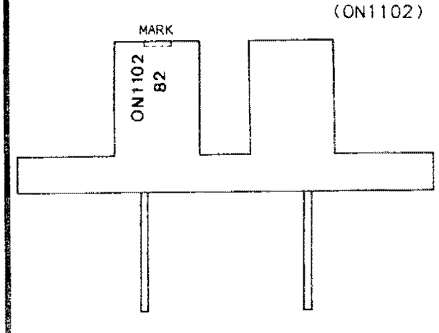
PNTLR 206
(TLR206)
PNTLG206
(TLG206)

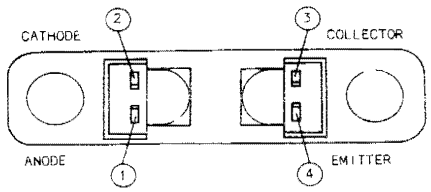


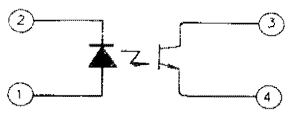
1.ANODE
2.CATHODE

D-8 PHOTO INTERRUPTER

PNON1102
(ON1102)

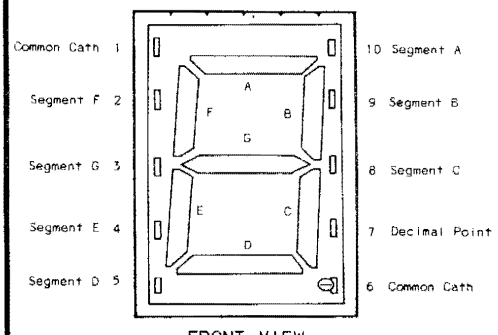






D-9

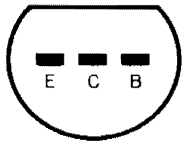
LED DISPLAY PNFND367
(FND367)



FRONT VIEW

TRANSISTOR

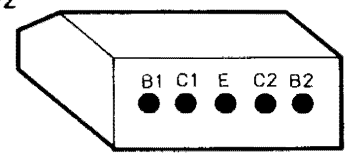
Tr-1



BOTTOM VIEW

QA720R
(2SA720R)
QA1015GR
(2SA1015GR)
QA1020Y
(2SA1020Y)
QC1685R
(2SC1685R)
QC1815BL
(2SC1815BL)

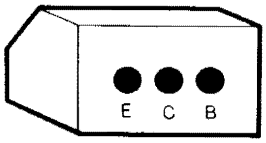
Tr-2



BOTTOM VIEW

QA798G
(2SA798G)

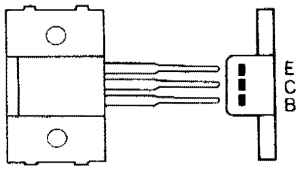
Tr-3



BOTTOM VIEW

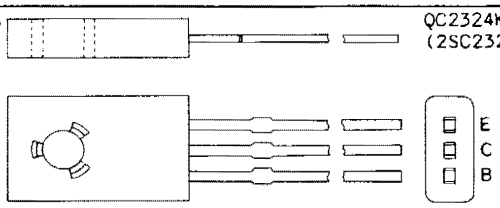
QB564L
(2SB564L)

Tr-4



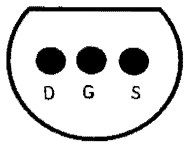
QB616R
(2SB616R)

Tr-5



QC2324K
(2SC2324K)

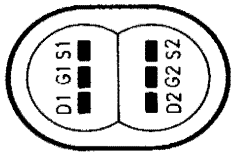
Tr-6



BOTTOM VIEW

Q2SK105J
(2SK105J)
Q2SJ74BL
(2SJ74BL)

Tr-7



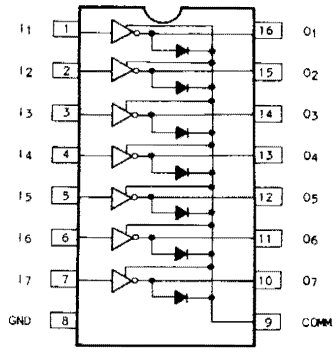
BOTTOM VIEW

Q2K146BL
(2SK146BL)

IC

IC-1 TRANSISTOR ARRAY

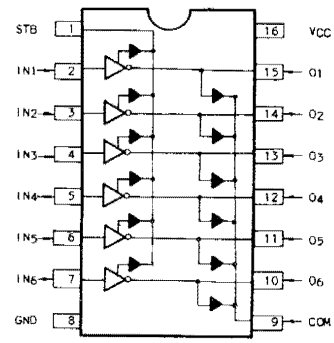
ITD 62301
(TD 62301)



TOP VIEW

IC-2 TRANSISTOR ARRAY

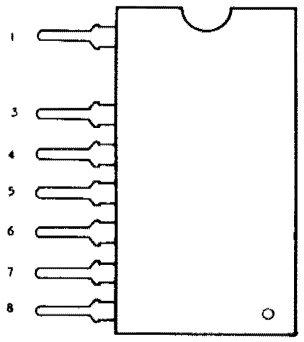
IM54533P
(M54533P)



TOP VIEW

IC-6

IHA12017
(HA12017)

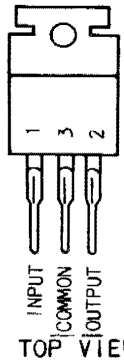


PIN FUNCTION

1 OUT	6 IN +
3 BIAS	7 IN -
4 -VCC	8 +VCC
5 COMP.	

IC-3 VOLTAGE REGULATOR

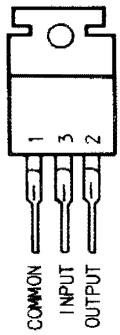
IHC14305(μPC14305)
IHC14315(μPC14315)
or
IE15UC(μA7815UC)
IHC14324(μPC14324)



TOP VIEW

IC-4 VOLTAGE REGULATOR

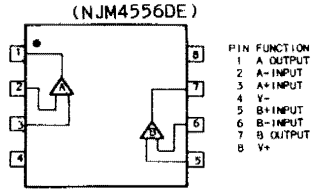
IMC7915C
(MC7915CT)
or
IE7915UC
(μA7915UC)



TOP VIEW

IC-5 I-0001

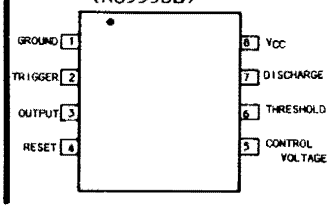
(NJM4559DE)
I-0009
(NJM4556DE)



TOP VIEW

IC-7 IRC555DB

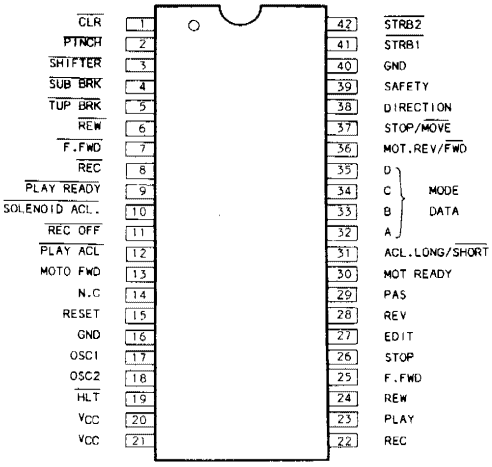
(RC555DB)



TOP VIEW

IC-8

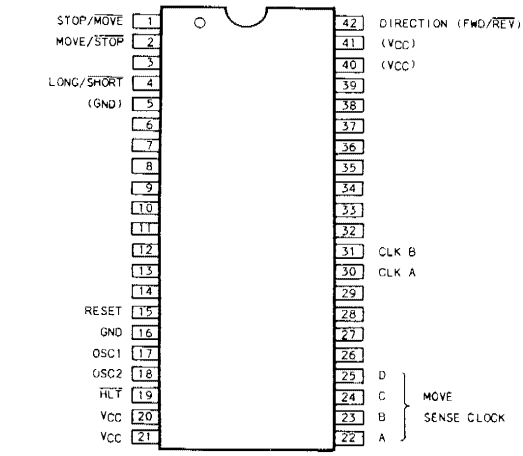
DECK CONTROL I-0012



TOP VIEW

IC-9

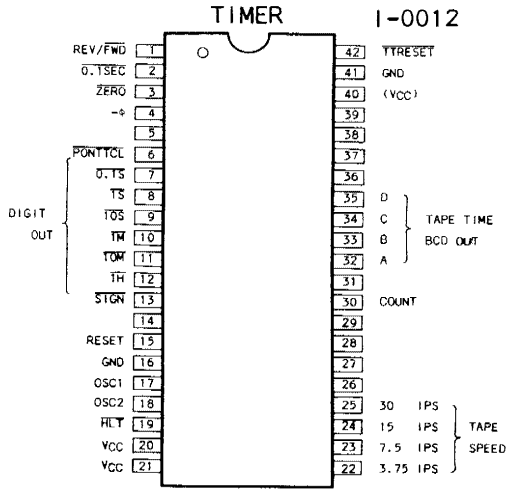
DIRECTION I-0012



TOP VIEW

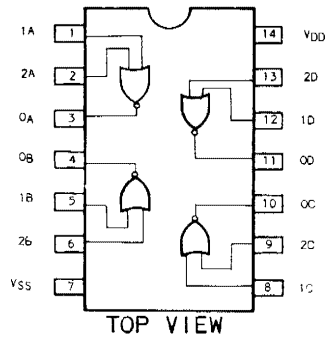
IC-10

TIMER I-0012



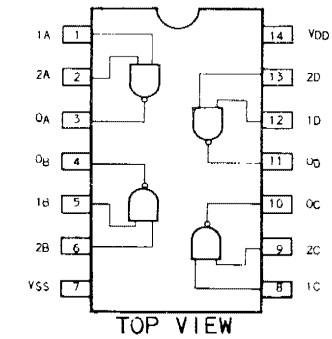
TOP VIEW

IC-11 IMC 14001
(MC 14001B)



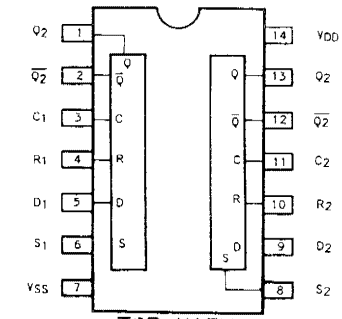
TOP VIEW

IC-12
IMC 14011
(MC 14011B)



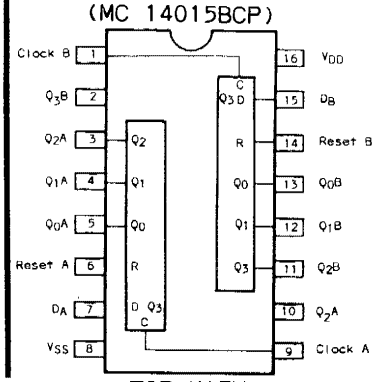
TOP VIEW

IC-13
IMC 14013
(MC 14013B)



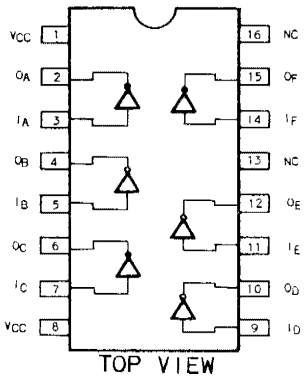
TOP VIEW

IC-14 IMC 14015
(MC 14015BCP)



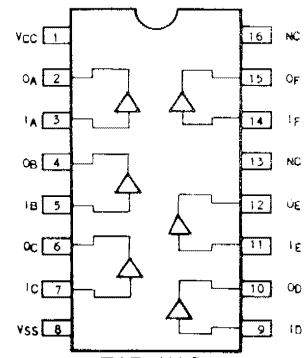
TOP VIEW

IC-15 IMC 14049
(MC 14049B)



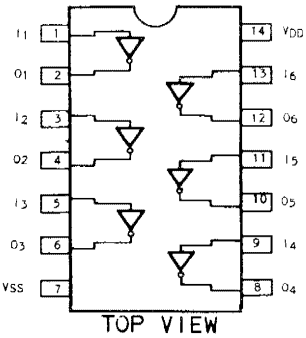
TOP VIEW

IC-16 IMC 14050
(MC 14050B)



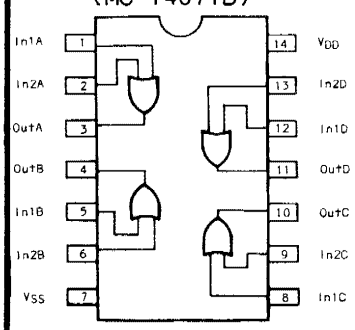
TOP VIEW

IC-17
IMC 14069
(MC 14069B)



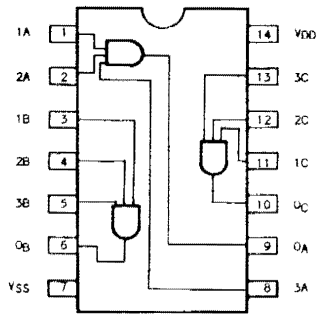
TOP VIEW

IC-18 IMC 14071
(MC 14071B)



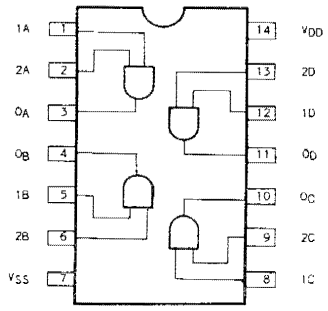
TOP VIEW

IC-19 IMC 14073
(MC 14073B)



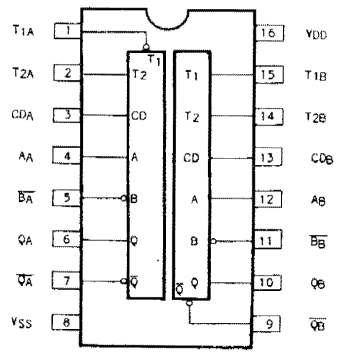
TOP VIEW

IC-20
IMC 14081
(MC 14081B)



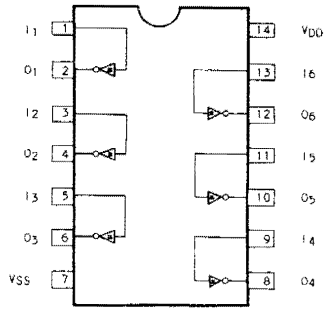
TOP VIEW

IC-21
IMC 14538
(MC 14538B)



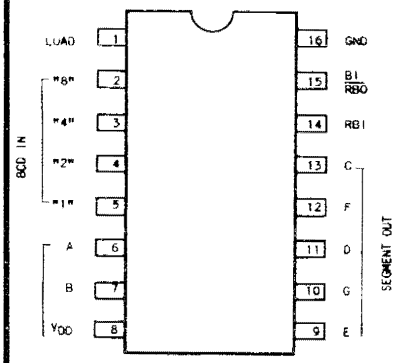
TOP VIEW

IC-22 IMC 14584
(MC 14584B)



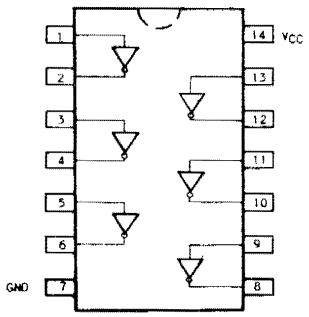
TOP VIEW

IC-23
IMSM 561
(MSM 561RS)



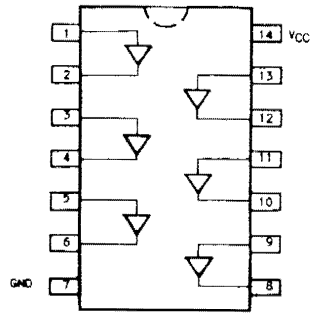
TOP VIEW

IC-24
IALS05N
(SN74LS05N)
IA06N
(SN7406N)



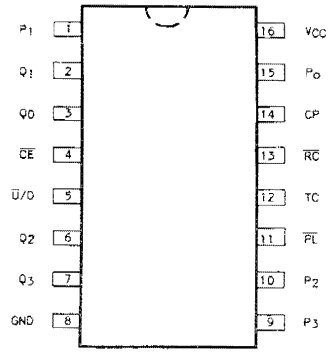
TOP VIEW

IC-25 IA07N
(SN7407N)



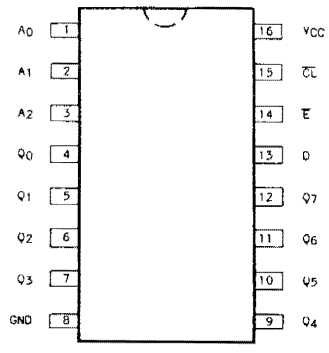
TOP VIEW

IC-26
IALS190N
(SN74LS190N)



TOP VIEW

IC-27
IALS259N
(SN74LS259N)



TOP VIEW

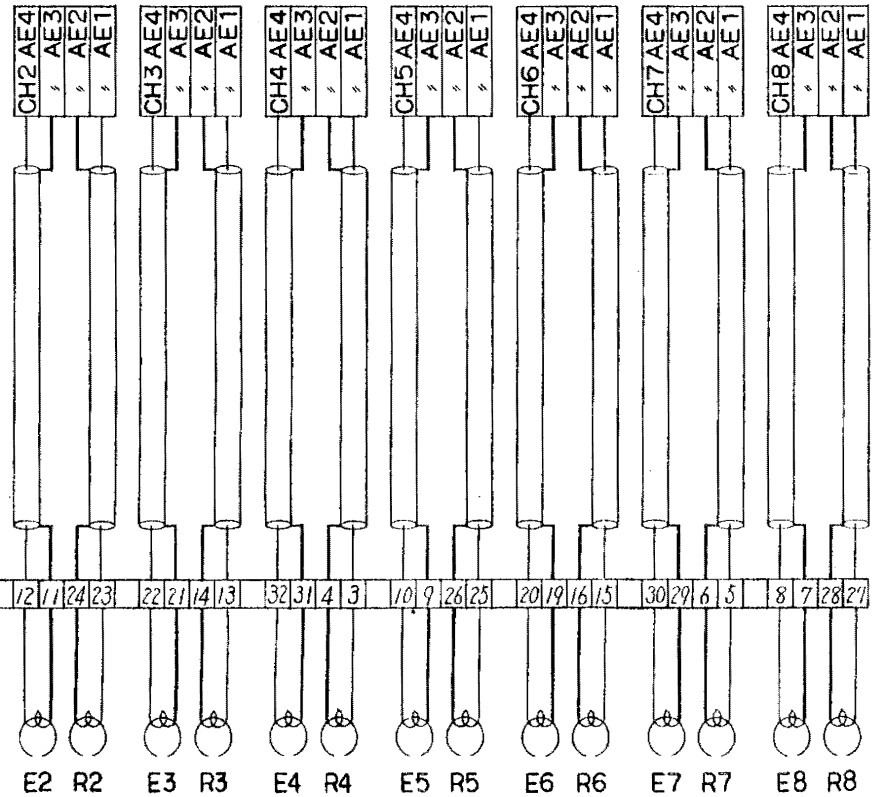
MX-5050 MK-III 8 TAPE RECORDER

SCHEMATIC DIAGRAMS

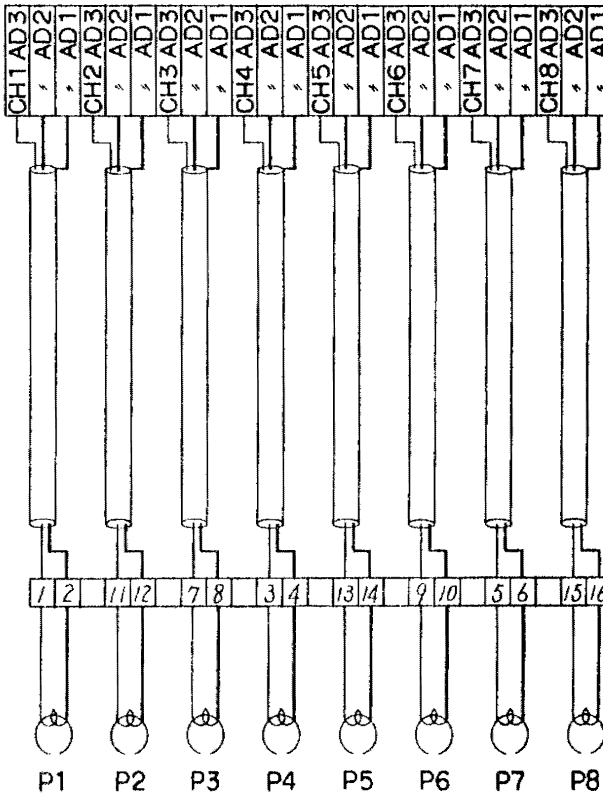
TYPE L ~

OTARI PART No.	ASSEMBLY NAME	DWG. No.
KH2H00B	Head Connection Diagram	4-28967
T50650B	Tape Transport Wiring Diagram	3-9051
PB82L0A	Timer PCB Ass'y	4-28963
PB44S0BA	Control PCB Ass'y	3-9052
A10460B	Amplifier Wiring Diagram	3-6431
PB15B0A	REC REP AMP PCB Ass'y	3-8498
PB45G0A	AMP Control PCB Ass'y	3-7133
PB76J0A	Mother PCB Ass'y	3-7134
PB45H0A	Mode Control PCB Ass'y	3-6298
PB15C0A	Head Phone PCB Ass'y	3-6394
PB45J0A	Mode Select PCB Ass'y	4-28994
PB76K0A	LED PCB Ass'y	4-29002
ZA62T0B	Cable Ass'y	4-28939
CB1100B	CB-110 Wiring Diagram	3-6372
PB82W0A	Tape Timer PCB Ass'y	4-28971
PB45K0A	Mode PCB Ass'y	3-6373
PB45L0A	Control PCB Ass'y	3-6374
PB76P0A	REC LED PCB Ass'y	4-28969
PB76W0A	Memory Switch PCB Ass'y	4-29000

品番	品名・規格	個数	備



ERASE / RECORD HEAD



REPRODUCE HEAD

TYPE NO(
( )AT THI

NOTE : ——— Hot

——— Cold or Shield

元図	生図	取説図	TYPE
3-6400	4-28966	4-28967	

記号	改訂番号	年月日	担当	承認
5				
4				
3				
2				
1				

承認	ｺﾝﾌﾟ 81.5.25	検図	ｱﾏﾓﾄ 81.4.28	設計		製図	オオクマ 81.4.27	尺度	第三角法
								単位 mm	

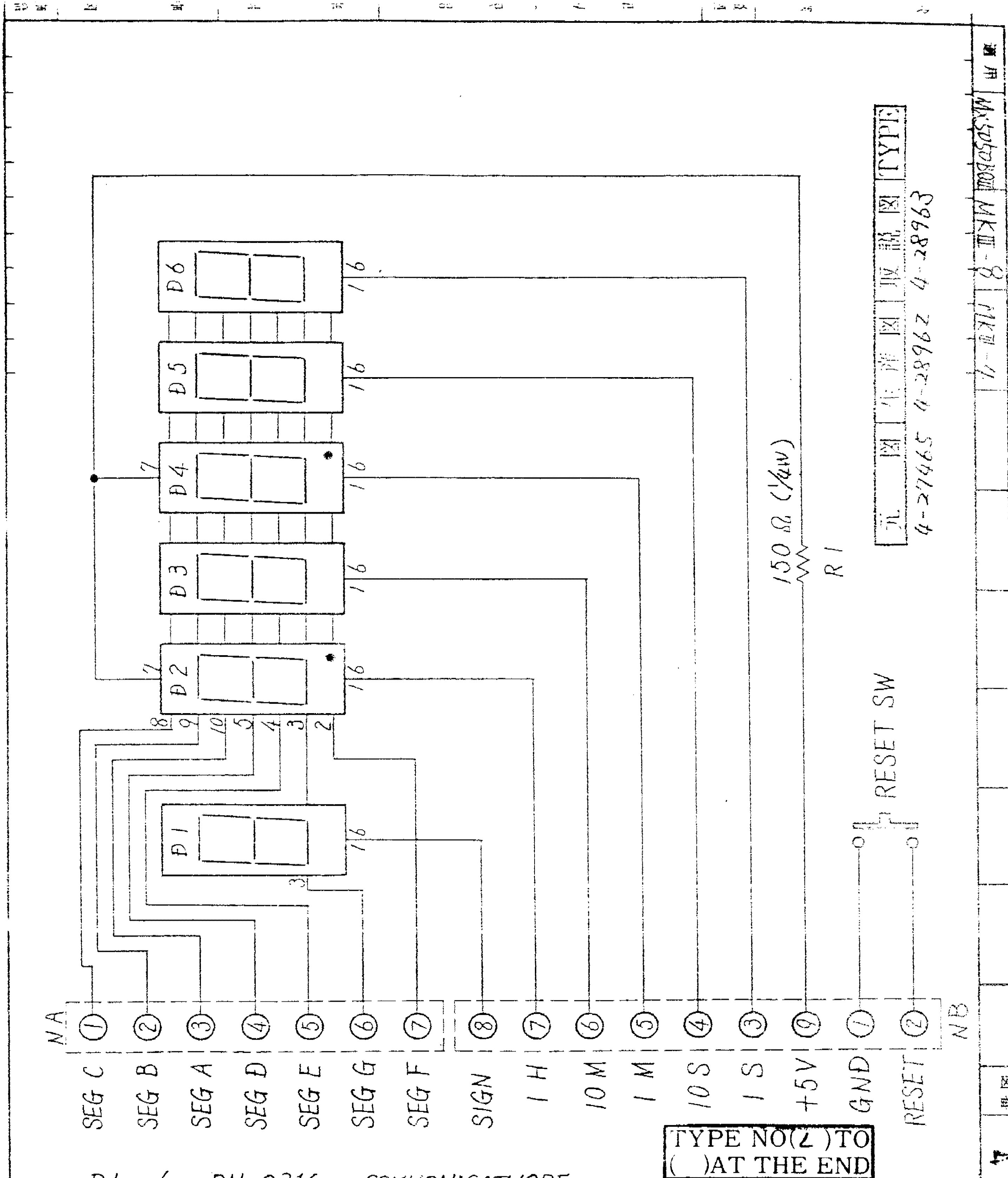
材料	
仕上	指定以外のエッジはイトメのこと
処理	
普通寸法差	OS JIS — 級

	OTA 小谷電機
形式	
品名	Head
図名	Connectio
品番	KH2

07 37 4 17 2,500

7

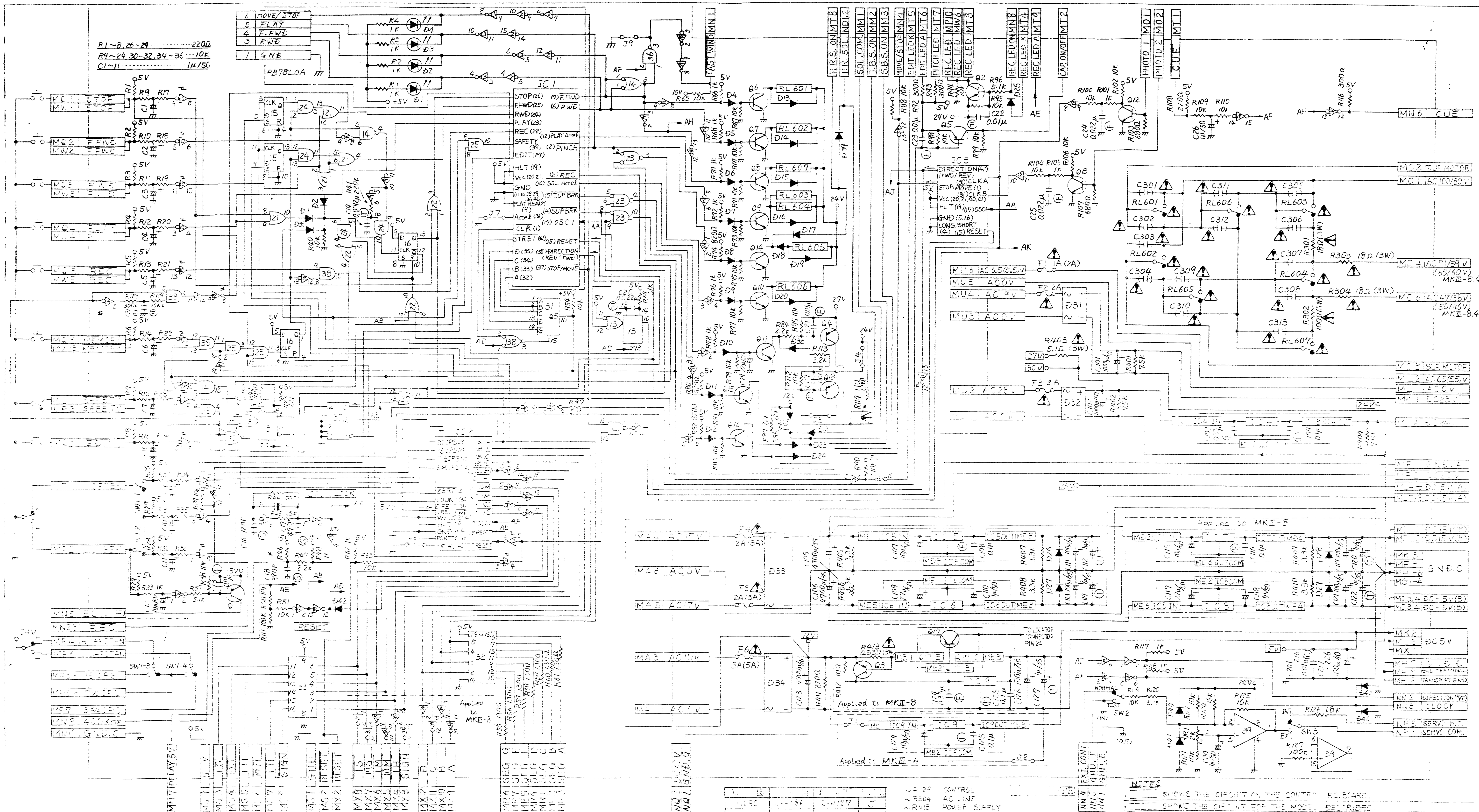
BLK
WHT
GRN
LINE
NEUTRAL
6× PB9A385
TIMER PCB Ass'y
PB9A396A
RESET
CONTROL PCB
PB9A437A
MOTHER PCB
PB9A417
CAPSTAN MOTOR PCB
PB9A311
PB9A312
PB9A310
LOCATOR CONNECTOR
TALLY PCB Ass'y
PB-78L
PB9A441
MODE SELECT PCB
SUP. REEL MOTOR
TUP. REEL MOTOR
PB9A179
PB9A178
PB9A177A
PB9A176
PINCH ROLLER SOL
REEL
POWER
SPEED
EDIT
MEMORY
REC
F.FWD
RWD
PLAY
STOP
SAFETY
TO EXT CONTROL CONNECTOR
TO EXT CONTROL CONNECTOR
TO MP10
TO NA2~5
TO MP8~9
TO EXT COLLECTOR
TENSION ARM
FAST
TYPE NO( )TO
( )AT THE END
2-4179 | 3-8083 | 3-8084 | J
3-9051 | L
DRAWN
DESIGNED
CHECKED
APPROVED
Otari Electric Co.,Ltd.
NAME TAPE TRANSPORT
PART No.
DWG No. PB32100



D1 ~ 6 PN-0214 COMMON:CATHODE

5		. .			材料		OTARI 小谷電機株式会社
4		. .					
3		. .			仕上	指定以外のエッジはイトメのこと	形式
2		. .					
1		. .			処理		品名 TIMER PCB ASSY
記号	改訂番号	年 月 日	担当	承認	普通寸法差	OS / JIS 一 級	図名 CIRCUIT DIAGRAM
承認		検図 リ 80.7.22	設計 リ 80.7.22		製図 オオクマ 80.7.22	尺度 N / 第三角法 / 単位 mm	品番 PB82L0A

28963



Reference No.		OTARI Part No.	Description
IC	2, 3	I-0012	Universal Controller
	4	IHC14324	μPC14324
	5, 7	IHC14315	μPC14315
	6, 8	IMC7915C	MC7915CT
	9	IHC14305	μPC14305
	10, [illegible], 12	IMC14584	MC14584 BCP
	13	IMC14538	MC14538 BCP
	14, 36	IMC14011	MC14011 BCP
	15, 16	IMC14013	MC14013 BCP
	17, 20	IMC14049	MC14049 BCP
	18	IMC14050	MC14050 BCP
	19	IMC14069	MC14069 BCP
	21, 22, 23, 37	IMC14071	MC14071 BCP
	24, 25, 38	IMC14081	MC14081 BCP

Reference No.		OTARI Part No.	Description
IC	26, 27	IALS05N	SN74LS05N
	28, 34, 35	IA06N	SN7406N
	29	IA07N	SN7407N
	30	IALS190	SN74LS190
	31	IALS259	SN74LS259
	32	IMSM561	MSM561RS
	33	ITD62301	TD62301
	39	IHC4558C	μPC4558C
X	1	PZ4C014	KBR-400B A Type
RL	603~607	RY1DC029	G2U-112P-US(DC24V)
	601~602	RY1DC040	G2R-117P-V(DC24V)
C	301~313	CZZ0001W	CRU112(0.1μ+120Ω)
D	1~12, 35, 36, 40~42	PN1S1588	1S1588

Reference No.		OTARI Part No.	Description	
D	13~30, 37~39	PNSM1-02	SM1A-02	
	31~32	PNS2VB20	S2VB20	MKIII-4
	34	PNS5VB20	S5VB20	
	31, 32	PNS2VB20	S2VB20	MKIII-8
	33, 34	PNS5VB20	S5VB20	
	43, 44	PN-0264	ERA82-004	
Q	1, 2, 3	QA1015GR	2SA1015GR	
	4, 5, 18	QA1020Y	2SA1020Y	
	6~13	QC1685R	2SC1685R	
	14~16	QC2324K	2SC2324K	
	17	QB616R	2SB616R	
SW	1	WH34008	SW335	
	2, 3	WH41045B	DLA (BLACK)	

Reference No.		OTARI Part No.	Description	
F	1	FH7F010	125V, 1A	MKIII-4
	2, 4, 5	FH7F020	125V, 2A	
	3, 6	FH7F030	125V, 3A	
	1, 2	FH7F020	125V, 2A	MKIII-8
	3~5	FH7F030	125V, 3A	
	6	FH7F050	125V, 5A	
J	1, 2, 9	PZ4E001	MKIII-4	
	(3, 6)		SOLENOID, GPIB06	
	4, 5		SOLENOID, GPIB10	
	(7)		QUICK START TIME	
	(8)		TIMER FIGURE	
VR	1	RV423171	RJC094P202	

[illegible]	[illegible]	[illegible]	[illegible]
-1090	[illegible]	3-4197	J
		3-8376	K
		3-9052	—

~R129 CONTROL
~R304 AC LINE
~R418 POWER SUPPLY
~C31 CONTROL
~C127 POWER SUPPLY
~C226 5V LINE
~C313 AC LINE

NOTES UNLESS OTHERWISE SPECIFIED
1. [illegible] 5%
2. [illegible]
3. CAPACITOR SYMBOLS ARE AS FOLLOWS
ALUMINUM ELECTROLYTIC CAPACITOR
BIPOLAR ALUMINUM ELECTROLYTIC CAPACITOR
MYLAR FILM CAPACITOR 50V
POLYSTYRENE FILM CAPACITOR (±5%, 50V)
CERAMIC CAPACITOR
MICA CAPACITOR (±5%)
TANTALUM ELECTROLYTIC CAPACITOR
POLYPROPYLENE FILM CAPACITOR (±5%)
LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR
METALLIZED PAPER CAPACITOR (±10%)
SPARK KILLER
4. SAFETY COMPONENT. REPLACE ONLY WITH THE SPECIFIED COMPONENT FOR SAFETY REASON.

NOTES
· SHOWS THE CIRCUIT ON THE CONTROL P.C.BOARD.
· SHOWS THE CIRCUIT FOR THE MODEL DESCRIBED.
CHANGE OF RESISTOR VALUE (※ R46)

MKIII-4	MKIII-8
6.8K	6.2K

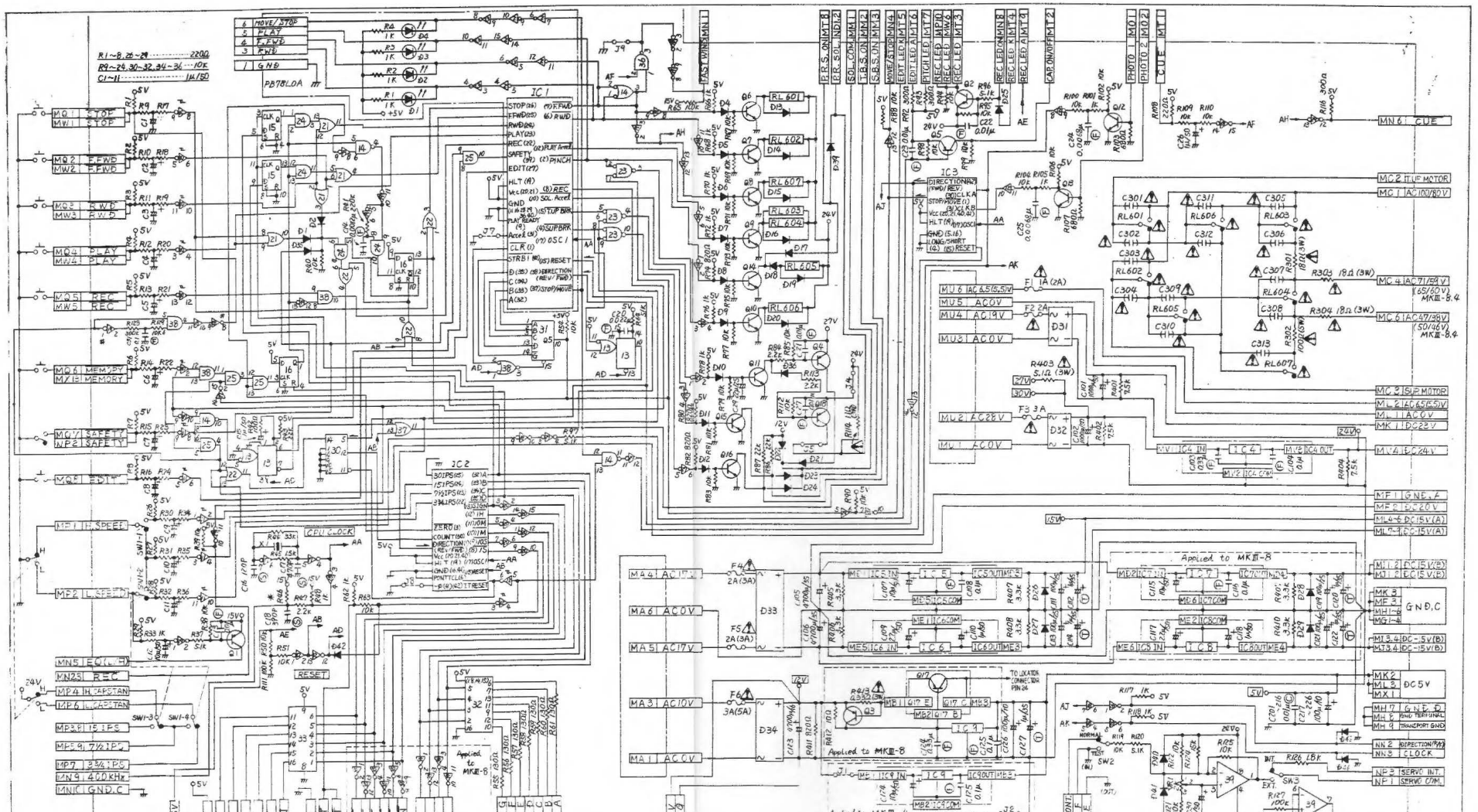
AT THE END

OTARI Electric Co., Ltd.

CONTROL P.C.B. Assy

PB44S0BA

DWG. No. 3-9052



Reference No.	TOKAI Part No.	Description.
IC 2,3	J-0012	Universal Controller
4	IHC14324	μPC14324
5.7	IHC14315	μPC14315
6.8	IMC7415C	M74115CT
9	IHC14305	μPC14305
10.11.12	IMC14584	MC14584 BCP
13	IMC14528	MC14538 BCP
14,36	IMC14011	MC14011 BCP
15.16	IMC14015	MC14013 BCP
17.20	IMC14049	MC14049 BCP
18	IMC14050	MC14050 BCP
19	IMC14069	MC14069 BCP
21,22,23,37	IMC14071	MC14071 BCP
24,25,38	IMC14081	MC14081 BCP
26,27	IAL505N	SN74LS05N
28,34,35	IAC6N	SN74C06N
29	IAD7N	SN7407N
30	IALS190	SN74LS190
31	IALS259	SN74LS259
32	IMSM561	M5M561RS
33	ITD62301	TD62301
39	IHC4558C	μPC4558C
X 1	PE4C014	KBR-4008 A Type
RL 603~607	IRYIDC024	G2U-112P-US(DC24)
601~602	IRYIDC060	G2R-1-E(DC60)
C 301~313	CEZD001W	CEUR1V(Elec+220Ω)
D 1~15	IN1S1588	1S1588

Reference No.	TOKAI Part No.	Description.
D 16~30,37~39	PNSM1-02	SM1A-02
31~33	PNS2VB20	S2VB20
34	PN3SVB20	S3VB20
35,36	PNS2VB20	S2VB20
39,34	PNS5VB20	S5VB20
43,44	PN-0264	ERA82-004
1,2,3	QA1015GR	2SA1015GR
4,5,18	QA1020Y	2SA1020Y
6~13	QC1685R	2SC1685R
14~16	QC2924K	2SC2924K
17	QR616R	2SB616R
SW 1	WH34008	SW335
2,3	WH9104B	BLA (BLACK)

Reference No.	TOKAI Part No.	Description.
F 1	FH7F010	125V, 1A
2,4,5	FH7F020	125V, 2A
3,6	FH7F030	125V, 3A
1,2	FH7F020	125V, 2A
3~5	FH7F030	125V, 3A
6	FH7F050	125V, 5A
J 1,2,9	PE4ED01	MK II~4
(3,6)		SOLENOID, GP1B06
4,5		SOLENOID, GP1B40
(7)		QUICK START TIME
(8)		TIMER FIGURE
VR 1	RV423171	RJC0944P202

~R129	CONTROL	
~R304	AC LINE	
~R418	POWER SUPPLY	
~C31	CONTROL	
~C127	POWER SUPPLY	
~C226	5V LINE	
~C315	AC LINE	

1~1090	2-4186	2-4189 J
		3-8376 K
		3-9052 L

NOTES

SHOWS THE CIRCUIT ON THE CONTROL P.C.BOARD.

SHOWS THE CIRCUIT FOR THE MODEL DESCRIBED.

● CHANGE OF RESISTOR VALUE (@ R46)

MKII-4	MKII-5
6.8K	6.2K

TYPE NO(L)TO( ) AT THE END

7						DRAWN	81.9.14
6						DESIGNED	81.9.17
5						CHECKED	81.9.22
4						APPROVED	82.1.6
3							
2							
1							
MARK	REV. NO.	DATE	SHEET	SIZE			

TOKAI Tokai Electric Coil Co.

CONTROL P.C.B. Assy

PB44SDBA

DWG. NO. 3 9052

3-9052

改訂	作成図	取替図	TYPE
2-3456	3-6331	3-6332	A
	3-6430	3-6431	B

品名	AMPLIFIER Assy
品番	A1046
図名	WIRING DIAGRAM
図番	A1046B

SCH-3431

LED PCB FE9441Z

MODE SELECT PCB FE9441A

H PHONE JACK

H PHONE PCB(2) FE9442A

H PHONE PCB(1) FE9443A

H PHONE OUTPUT VR

EXT DSC JACK

TEST OSC SW

MODE CONTROL PCB PB9A410

HONDA MRP CONNECTER

CABLE Assy ZA6210A

MOTHER PCB FE9440A

CONTROL PCB FE9A437A

PEAK LED PCB PE9A441Z

INPUT SEL

INPUT VR

LINE INPUT

LINE OUTPUT

LAMP PCB PE9A442E

LAMP PCB PE9A442E

TYPE NO(K)TO ( )AT THE END

1-821	
2-3398	
3-6494	A
3-6943	E
3-7049	F
3-7132	G
3-8032	J
3-8498	K

Function of Switches and Relay		
Ref. Number	Function	Position
SW 101	Output level SW	High (+4dBm)
SW 201	Input level SW	High (+4dBm)
RL 301	Record Relay	OFF

Function of Potentiometers	
VR101	SEL/REP. Level
VR102	REP. EQ of 103 High and Low Speed
VR104	Low Frequency Compensation
VR105	REP. Level
VR106	Input Level
VR107	VU Meter Trigger Level
VR108	PEAK Indicator Trigger Level
VR201	TEST OSC Level
VR202 203	REC. EQ of High and Low Speed
VR204	REC. Level
VR205	REC. Bias Level
VR206	Input SRL Level
VR207	Symmetry Adjust
VR II (~14)	LINE Input Level

(T) Tantalum Capacitor
(F) Mylar-film Capacitor
(S) Polystyrene film Capacitor
(P) Polypropylene film Capacitor
(B) Bipolar electrolitic Capacitor
(L) Low leakage current electrolitic Capacitor
(C) Ceramic Capacitor

EQ	Period	Q 106	D 125	R 130	Q 209	D 205	R 217	C 208	R 131	R 133	R 205	C 215	R 231	R 232	R 233	C 218	C 219
NAB	H	S	NL	N	NL	NL	N	N	4.3k	4.3k	9.1k	0.0015 μF	NL	13k	39k	NL	NL
IEC	H	NL	NL	NL	NL	NL	S	NL	2.7k	5.6k	NL	NL	9.1k	6.8k	47k	0.0033 μF	10.0 μF

S: Short, N: Need, NL: Needless

Reference Number		Otari Part Number	Description
IC	101	IHA12017	HA12017
	102, 3 202, 3	I-0001	NJM4559AD-E
	104	I-0009	NJM4556D
	204, 304	IMC14011	MC14011B
	205	IMC14013	MC14013B
	301	IMC14015	MC14015B
	302	IMC14584	MC14584B
	303	IMC14071	MC14071B

Reference Number		Otari Part Number	Description
Q	103	QA798G	2SA798G
	104, 207 302~5	QA1015GR	2SA1015GR 2SA733P
	209~10	QA720R	2SA720R
	109, 13~15 206, 8 211, 12 301	QC1815BL	2SC1815BL 2SC945OK
	102, 16	QC1844E	2SC1844E

Reference Number		Otari Part Number	Description
Q	101, 5, 6 108, 11	Q2SK105J	2SK105J 2SK117BL or GR 2SK362BL or GR
	204, 14 107, 10, 12 117~19 201, 3, 5, 13	Q2SJ74BL	2SJ74BL 2SJ104 V or BL
D	212, 13	PNIN4448	IN4448
	102, 4, 9, 16 113~15 214	PNRD22EB	RD22EB

Reference Number		Otari Part Number	Description
D	105~8 111, 12 202, 3 205~8 211, 15, 16 301, 2	PNIS1588	1S1588 1S953
	201, 9, 10 303, 10, 3	PNSMI-02	SMIA02
RL	301	RY2YC052	G2V-1002H

THIS SCHEMATIC DIAGRAM IS APPLIED TO PB-142B : PB-142BA

DRAWN STEL 71.1.17
DESIGNED TEL 80.11.1
CHECKED A.K.T.N.K 5.22
APPROVED 5-22 M. F. 5.27

OTARI Otari Electric Co.Ltd

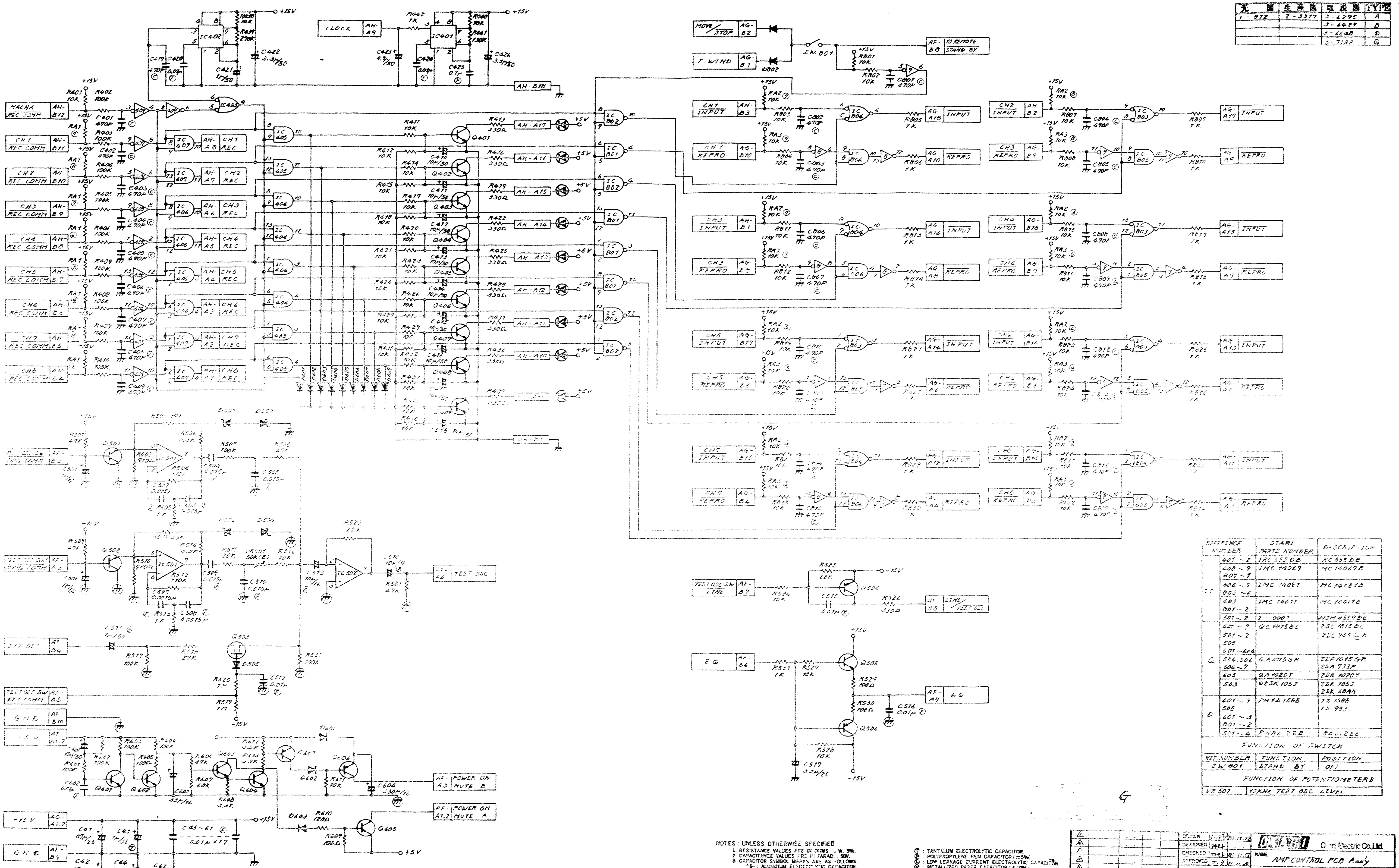
NAME REC REP AMP PCB Assy

PART No. PB15B0A

DWG No. 4- .801

3 . . 8498 821

元図	生産図	取説図	TYPE
1-812	2-3377	3-6295	A
		3-6429	B
		3-6648	D
		3-7133	G



REFERENCE NUMBER		OTARI PARTS NUMBER	DESCRIPTION
IC	401 ~ 2	IRC 555 DE	RC 555 DE
	408 ~ 9 807 ~ 9	IMC 14069	MC 14069 B
	406 ~ 7 803 ~ 6	IMC 14081	MC 14081 B
	403 801 ~ 2	IMC 14011	MC 14011 B
	501 ~ 2	I - 0001	NJM 4559 DE
Q	401 ~ 9 501 ~ 2 505 601 ~ 604	QC 1815 BL	2SC 1815 BL 2SC 945 (L)K
	504, 506 606 ~ 7	QA 1015 GR	2SA 1015 GR 2SA 733 P
	605	QA 1020 Y	2SA 1020 Y
	503	Q2SK 105 J	2SK 105 J 2SK 68 AM
D	401 ~ 9 505 601 ~ 3 801 ~ 2	PN 1S 1588	1S 1588 1S 953
	501 ~ 4	PNRL 2EB	RD 6.2EB

FUNCTION OF SWITCH

REF. NUMBER	FUNCTION	POSITION
SW 801	STAND BY	OFF

FUNCTION OF POTENTIOMETERS

VR 501	10KHz TEST OSC LEVEL

G

NOTES : UNLESS OTHERWISE SPECIFIED
1. RESISTANCE VALUES ARE IN OHMS, ¼ W, 5%.
2. CAPACITANCE VALUES ARE IN FARAD, 50V.
3. CAPACITOR SYMBOL MARKS ARE AS FOLLOWS.
- ALUMINUM ELECTROLYTIC CAPACITOR.
- Ⓑ BIPOLAR ALUMINUM ELECTROLYTIC CAPACITOR
- Ⓜ MYLAR FILM CAPACITOR (±5%, 50V)
- Ⓢ POLYSTYRENE FILM CAPACITOR (±5%, 50V)
- Ⓒ : CERAMIC CAPACITOR.
- Ⓜ : MICA CAPACITOR (±5%)
- Ⓣ : TANTALUM ELECTROLYTIC CAPACITOR.
- Ⓟ : POLYPROPYLENE FILM CAPACITOR (±5%)
- Ⓛ : LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR.
- Ⓜ : METALLIZED PAPER CAPACITOR (±10%)
- : SPARK KILLER.

4. ⚠ : SAFETY COMPONENT , REPLACE ONLY WITH THE SPECIFIED COMPONENT FOR SAFETY REASON.

MRK	REV. No.	DATE	DWN	APP
⚠				
⚠				
⚠				
⚠				
⚠				
⚠				
⚠				

DRAWN		'81.11.12
DESIGNED		
CHECKED		'81.11.17
APPROVED		

OTARI Otari Electric Co.,Ltd.

NAME AMP CONTROL PCB Assy

PART No. PB45G0A

DWG No. 1- 812

3.7133-812

1-811	3-3316	3-7139
3-6296		

MOTHER PCB Assy.
DEBUG PROGRAM
PB 763 0A

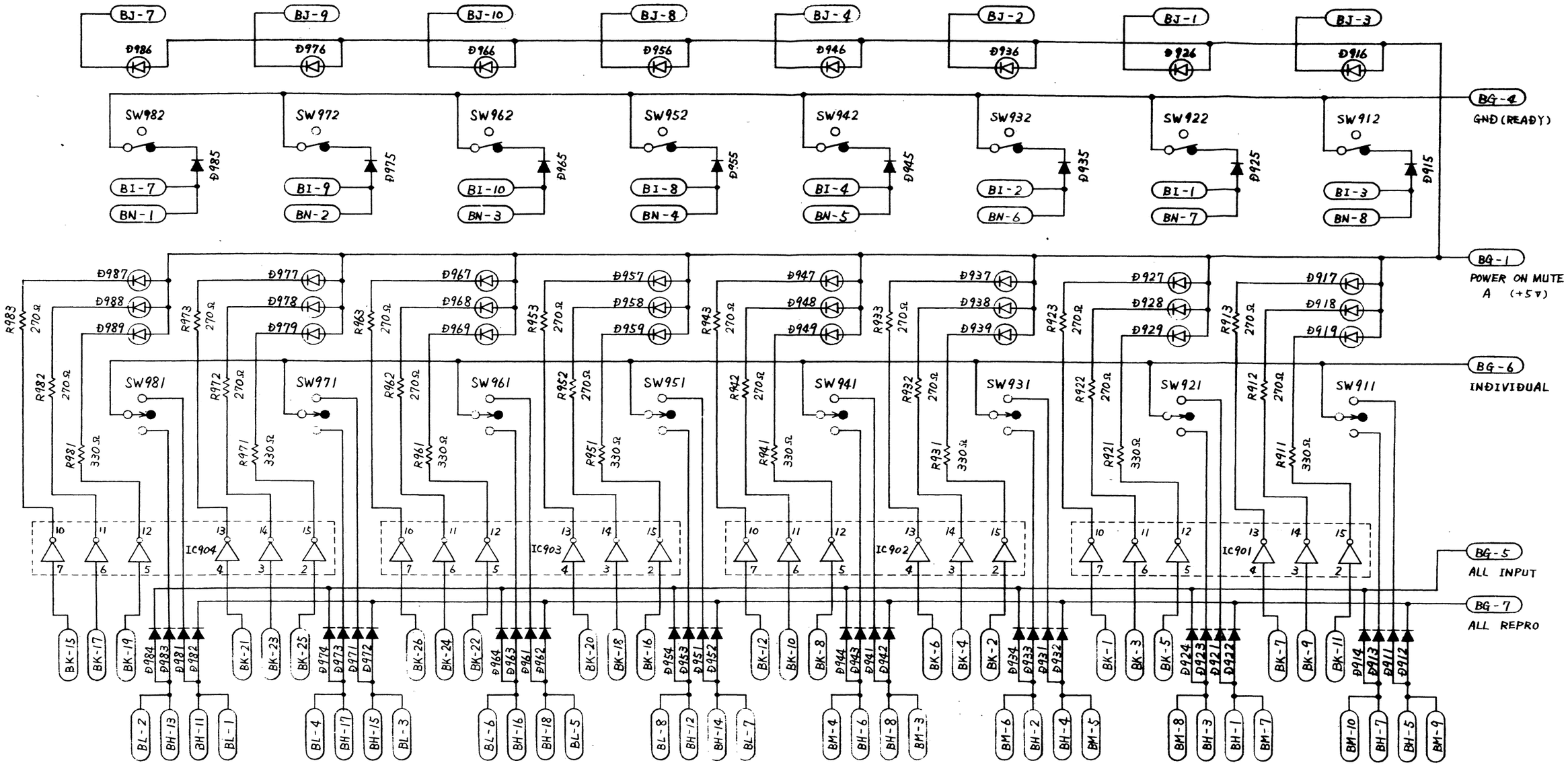
TYPE NO. 763 0
(AT THE END)

CH1 CH2 CH3 CH4 CH5 CH6 CH7 CH8

+5V (P.O.M.A)

To CH2 To CH3 To CH4 To CH5 To CH6 To CH7

3-7134



BN-10	BF-1 GND (COMMAND)
BN-11	BF-2 POWER ON MUTE A (+5V)
BN-13	BF-3 +20V (UNREG)
BN-14	BF-4 GND (UNREG)
BN-12	BG-2.3 GND → to IC

Reference Number		ATARI Parts Number	Description
IC	901 ~ 4	IM54533P	M54533P
D	901 ~ 5	PN1S1588	1S1588, 1S953
	906	PNTLR124	TLR124
	907	PNTLY124	TLY124
	908	PNTLG124	TLG124A
	909	PNTLO124	TLO124

Function of Switch

Reference Number	Function	Position
SW 901	Monitor Mode Select	Normal SEL/REP
SW 902	Record Select	Normal Ready

改訂番号	年月日	担当	承認
5			
4			
3			
2			
1			

材料
仕上 指定以外のエッジはイトメのこと
処理
普通寸法差 OS JIS —級

承認	検図	設計	製図	尺度	第三角法
	イソイ 80.12.9	1ヨモト 80.10.13	1ヨモト 80.12.16		単位 mm

02-37 10-79-1.000

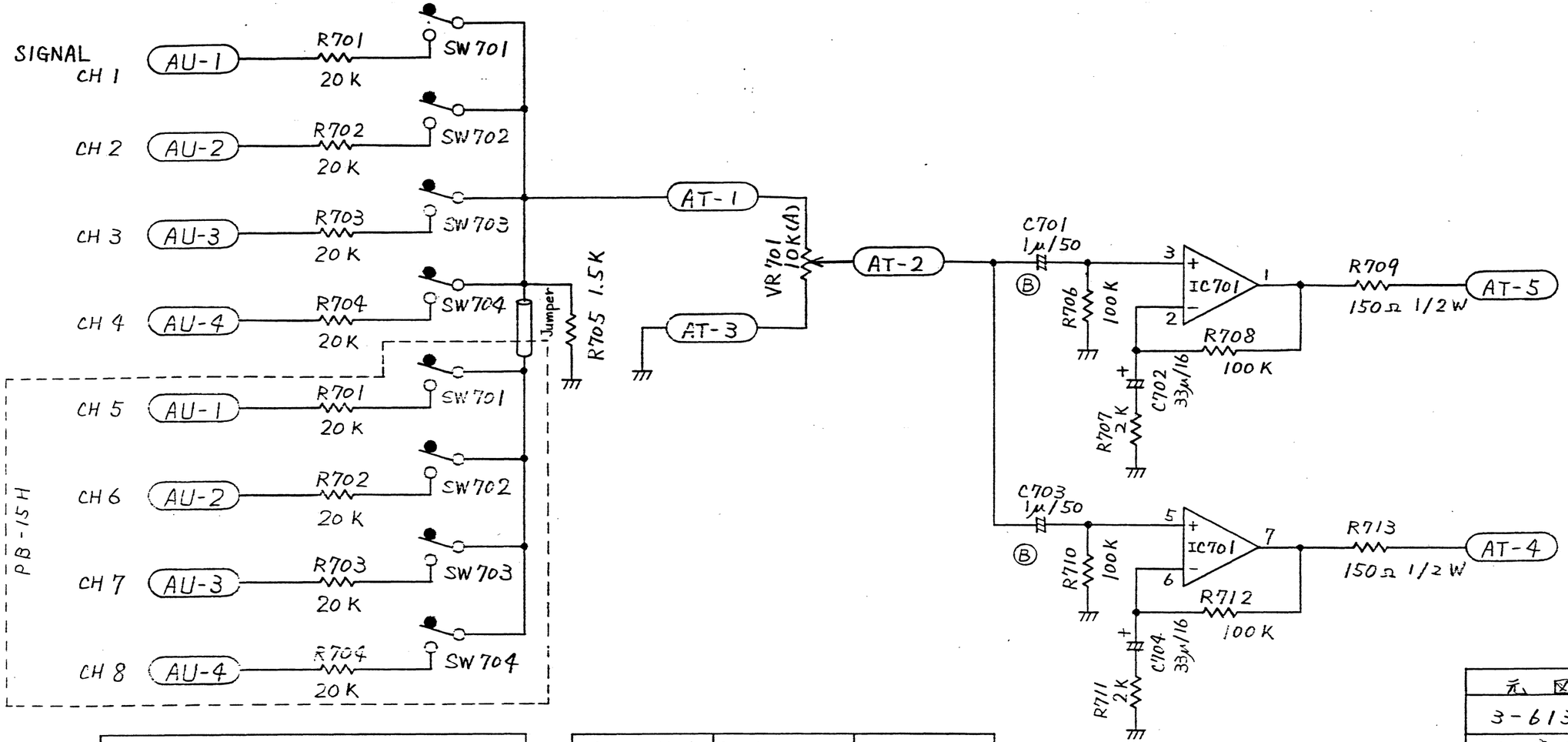
ATARI 小谷電機株式会社

形式	PB-45H
品名	MODE CONTROL PCB Assy
図名	CIRCUIT DIAGRAM
品番	PB45H0A

TYPE NO(A)TO (B)AT THE END

回路図	実体配線図	取扱説明書図	TYPE
			2-3280 3-6297 3-6298

3-6298 3-3280 2



Function of Switches		
Ref. Number	Function	Position
SW 701	Monitor SW ①⑤	Normal (OFF)
SW 702	Monitor SW ②⑥	Normal (OFF)
SW 703	Monitor SW ③⑦	Normal (OFF)
SW 704	Monitor SW ④⑧	Normal (OFF)
Function of Potentiometer		
VR 701	Head Phone Output Level	

Reference Number		Otari Part Number	Description
IC	701	I-0009	NJM4556DE

元 図
3-6136
生産図
3-6393
既製図
3-6394

TYPE NO(A)TO
( )AT THE END

NOTES : UNLESS OTHERWISE SPECIFIED
1. RESISTANCE VALUES ARE IN OHMS, ¼W, 5%.
2. CAPACITANCE VALUES ARE IN FARADS, 50V.
3. CAPACITOR SYMBOL MARKS ARE AS FOLLOWS.
   ⊣⊢ : ALUMINUM ELECTROLYTIC CAPACITOR.
   Ⓑ : BIPOLAR ALUMINUM ELECTROLYTIC CAPACITOR.
   Ⓕ : MYLAR FILM CAPACITOR (±5%, 50V)
   Ⓢ : POLYSTYRENE FILM CAPACITOR (±5%, 50V)
   Ⓒ : CERAMIC CAPACITOR.
   Ⓜ : MICA CAPACITOR (±5%)
   Ⓣ : TANTALUM ELECTROLYTIC CAPACITOR.
   Ⓟ : POLYPROPYLENE FILM CAPACITOR (±5%)
   Ⓛ : LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR.
   Ⓜ : METALLIZED PAPER CAPACITOR (±10%)
   ⊣⊢ : SPARK KILLER.
4. ⚠ : SAFETY COMPONENT ; REPLACE ONLY WITH THE SPECIFIED COMPONENT FOR SAFETY REASON.

MRK	REV. No.	DATE	DWN	APP
4				
3				
2				
1				

DRAWN	ｱｷﾓﾄ	80.12.11
DESIGNED	ｱｷﾓﾄ	80.7.14
CHECKED	ﾉﾑﾗ	2012 11
APPROVED	[illegible]	[illegible]

OTARI Otari Electric Co.,Ltd.

NAME HEAD PHONE PCB Assy

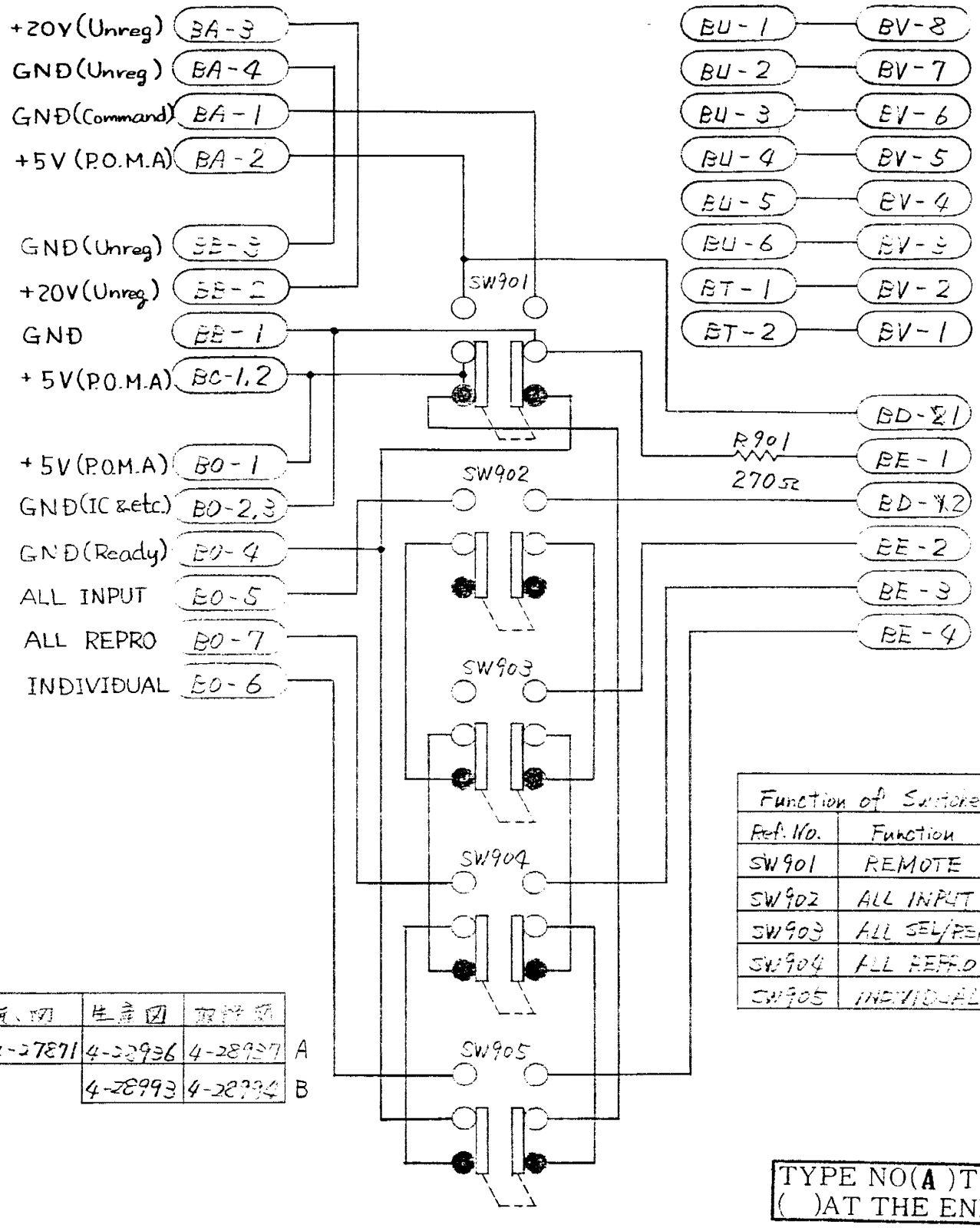
PART No. PB15C0A

DWG No. 3-..6136

MODEL MX5050MKII-8

DWG. No. 3-6394

部番	図番	品番	品名，定格	個数	備考



Function of Switches	
Ref. No.	Function
SW901	REMOTE
SW902	ALL INPUT
SW903	ALL SEL/REP
SW904	ALL REP.O
SW905	INDIVIDUAL

元図	生産図	承認図	
4-27871	4-28936	4-28937	A
	4-28993	4-28994	B

TYPE NO(A)TO
( )AT THE END

5		. .			
4		. .			
3		. .			
2		. .			
1		. .			
記号	改訂番号	年月日	担当	承認	

承認	ｴﾝﾀﾞ 81.5.25	検図	ｲﾝｲ 81.5.9	設計	ﾏｷﾓﾄ 80.11.10	製図	ﾏｷﾓﾄ 81.5.9	尺度	第三角法 / 単位 mm

材料	
仕上	指定以外のエッジはイトメのこと
処理	
普通寸法差	OS JIS — 級

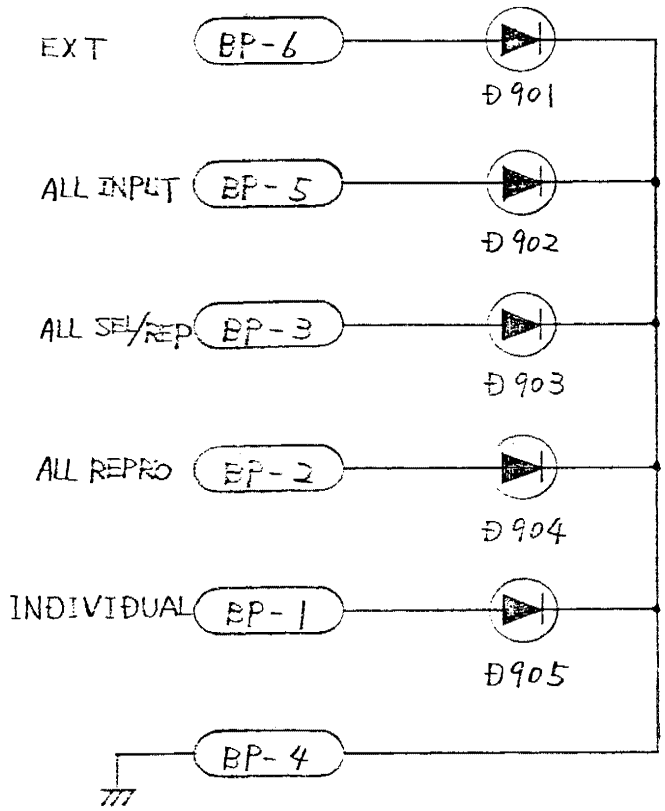
DATA
小谷電機株式会社

形式	PB-45J
品名	MODE SELECT PCB Assy
図名	CIRCUIT DIAGRAM.
品番	PB45J○A

図番 4-28994

適用 MYCOM-ﾏｲｺﾝ

部番	図番	品番	品名，定格	個数	備考



元図	生産図	取説図	TYPE
4-27874	4-29001	4-29002	

TYPE NO(A)TO
( )AT THE END

5					材料				DIAMOND 小谷電機株式会社		
4											
3					仕上	指定以外のエッジはイトメのこと			形式	PB-76K	
2											
1					処理				品名	LED PCB Assy	
記号	改訂番号	年月日	担当	承認	普通寸法差	OS	JIS	一級	図名	CIRCUIT DIAGRAM	
承認		検図	イシイ 80.11.17	設計	アキモト 80.11.17	製図	アキモト	尺度	第三角法 単位 mm	品番	PB76KOA

図番 4-29002

BL-2	CH8 INPUT	BR-1	CH8 INPUT
BL-1	CH8 REPRO	BR-2	CH8 REPRO
BL-4	CH7 INPUT	BR-3	CH7 INPUT
BL-3	CH7 REPRO	BR-4	CH7 REPRO
BL-6	CH6 INPUT	BR-5	CH6 INPUT
BL-5	CH6 REPRO	BR-6	CH6 REPRO
BL-8	CH5 INPUT	BR-7	CH5 INPUT
BL-7	CH5 REPRO	BR-8	CH5 REPRO

BM-1	N.C.		
BM-2	N.C.		
BM-4	CH4 INPUT	BR-9	CH4 INPUT
BM-3	CH4 REPRO	BR-10	CH4 REPRO
BM-6	CH3 INPUT	BR-11	CH3 INPUT
BM-5	CH3 REPRO	BR-12	CH3 REPRO
BM-8	CH2 INPUT	BR-13	CH2 INPUT
BM-7	CH2 REPRO	BR-14	CH2 REPRO
BM-10	CH1 INPUT	BR-15	CH1 INPUT
BM-9	CH1 REPRO	BR-16	CH1 REPRO

BN-1	CH8 REC	BR-19	CH8 REC
BN-2	CH7 REC	BR-20	CH7 REC
BN-3	CH6 REC	BR-21	CH6 REC
BN-4	CH5 REC	BR-22	CH5 REC
BN-5	CH4 REC	BR-23	CH4 REC
BN-6	CH3 REC	BR-24	CH3 REC
BN-7	CH2 REC	BR-25	CH2 REC
BN-8	CH1 REC	BR-26	CH1 REC
BN-9	N.C.		
BN-10	GND E (Command)	BR-27	GND E (Command)
BN-11	+5V (P.O.M.A)	BR-28	+5V (P.O.M.A)
BN-12	GND B (LED)	BR-29	GND B (LED)
BN-13	+20V (Unreg)	BR-30	+20V (Unreg)
BN-14	GND D (Unreg)	BR-31	GND D (Unreg)
BN-15	N.C.		

BR-17	STAND BY	AR-3	STAND BY
BR-18	MECHA REC	AR-2	N.C.
		AR-1	MECHA REC

BR-32	MEMORY	MW-1	MECHA STOP
BR-33	MECHA STOP	MW-2	MECHA F.FWD
BR-34	MECHA F.FWD	MW-3	MECHA RWD
BR-35	MECHA RWD	MW-4	MECHA PLAY
BR-36	MECHA PLAY	MW-5	MECHA REC
BR-37	MECHA REC	MW-6	REC LED ON
BR-38	REC LED ON	MW-7	N.C.
		MW-8	N.C.

BR-39	+5V (TIMER)	MX-1	+5V (TIMER)
BR-40	T.T. RESET	MX-2	T.T. RESET
BR-41	SIGN	MX-3	SIGN
BR-42	1H	MX-4	1H
BR-43	10M	MX-5	10M
BR-44	1M	MX-6	1M
BR-45	10S	MX-7	10S
BR-46	1S	MX-8	1S
BR-47	BCD DATA $\overline{A}$	MX-9	BCD DATA $\overline{A}$
BR-48	BCD DATA $\overline{B}$	MX-10	BCD DATA $\overline{B}$
BR-49	BCD DATA $\overline{C}$	MX-11	BCD DATA $\overline{C}$
BR-50	BCD DATA $\overline{D}$	MX-12	BCD DATA $\overline{D}$
		MX-13	MEMORY
		MX-14	N.C.
		MX-15	N.C.

HONDA
MRP
CONNECTER

TYPE NO(
( )AT THE

元図	生産図	取扱図
3-6395	4-28938	4-28939

5					材料										
4															
3					仕上	指定以外のエッジはイトメのこと									
2															
1					処理										
記号	改訂番号	年月日	担当	承認	普通寸法差	OS	JIS	—	級						
承認		検図	オオクマ 81.5.22	設計	アキモト 80.11.17	製図	アキモト 81.9.22	尺度		第三角法					
										単位 mm					

02 37 4 77 2500

		形式	ZA-6
		品名	CABLE
		図名	WIRING
		品番	ZA62

CB-110 REMOTE CONTROL UNIT OPERATION MANUAL

(1) GENERAL

The OTARI CB-110 Remote Control Unit is designed specifically for the MX-5050 MKIII-8.

The CB-110 takes over full function (Transport Control; Memory Function; Tape timer; Audio electrics control) of MX-5050 MKIII-8.

(2) CONNECTION

Connect the connector of the CB-110 to the connector of MX-5050 MKIII-8 located on the rear panel.

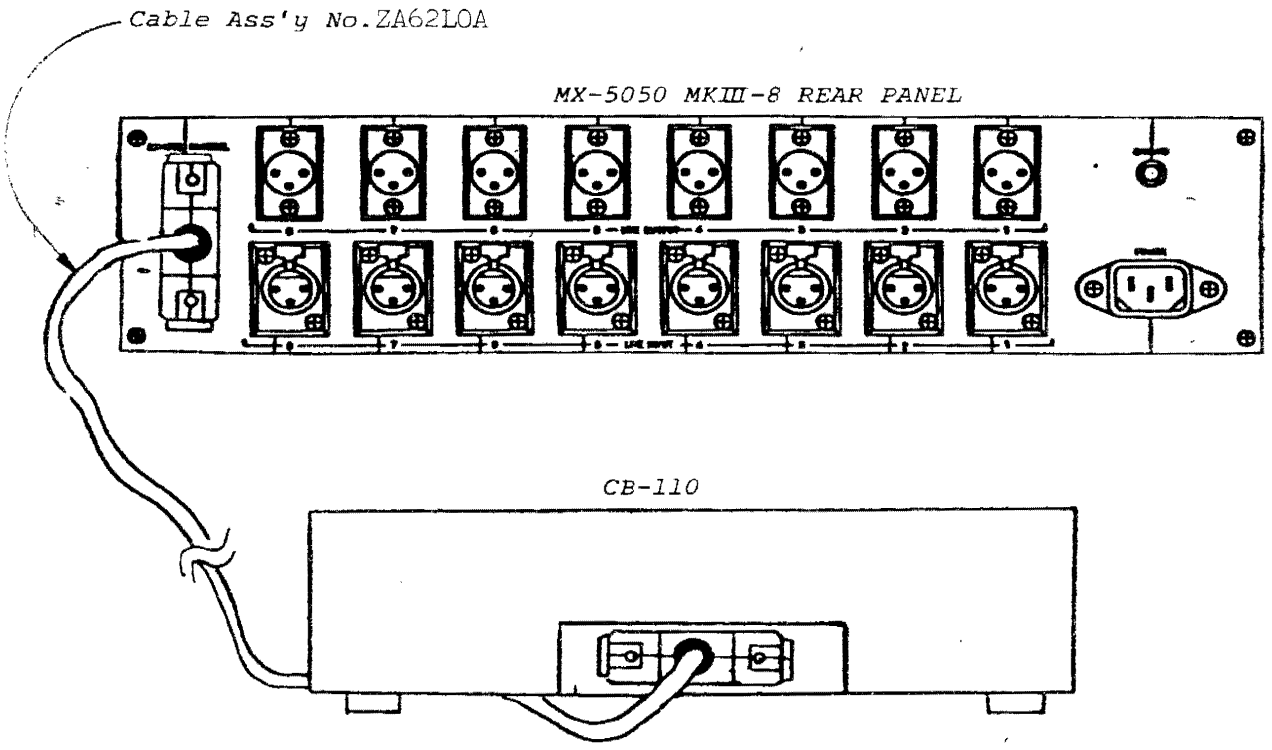
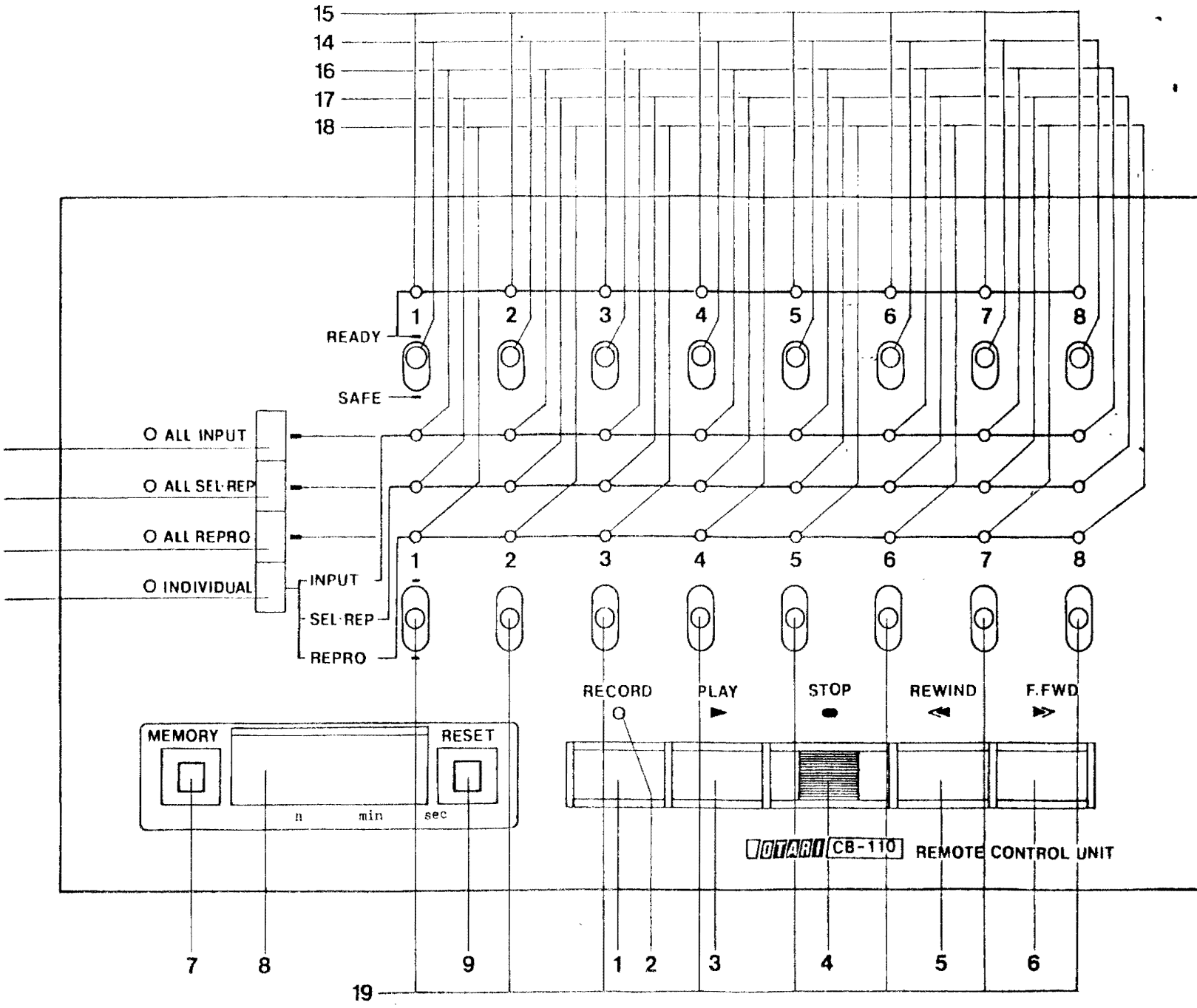


Fig 1 CONNECTION


15
14
16
17
18
1
2
3
4
5
6
7
8
READY
SAFE
O ALL INPUT
O ALL SEL·REP
O ALL REPRO
O INDIVIDUAL
INPUT
SEL·REP
REPRO
RECORD
PLAY
STOP
REWIND
F.FWD
MEMORY
RESET
n
min
sec
ATARI CB-110 REMOTE CONTROL UNIT
7
8
9
19
1
2
3
4
5
6

Index No.	Name	Function
1	RECORD pushbutton switch	Used in conjunction with the PLAY pushbutton and the READY/SAFE toggle switches on the front panel. Selecting READY position on desired channel, simultaneous pressing of PLAY and RECORD pushbuttons initiates RECORD mode. In the PLAY mode, when the RECORD pushbutton is pushed, the MX-5050 MKIII-8 into the RECORD mode. (This is called "Punch in".) In the RECORD mode, when the PLAY pushbutton is depressed, the MX-5050 MKIII-8 enters into the PLAY mode. (This is called "Punch out".) "Punch in" and "Punch out" are used for overdubbing in conjunction with the SEL/REP function.
2	RECORD indicator (red)	Indicates the RECORD mode.

Transport	Amplifier	Transport RECORD indicator * 1	Amplifier RECORD indicator * 2	Recording
non RECORD mode	SAFE	dark	dark	x
non RECORD mode	READY	blink	blink	x ready
RECORD mode	SAFE	lights	dark	x
RECORD mode	READY	lights	lights	o

		Blinking indicators means that the amplifier is in the RECORD-READY mode. Recording is being carried out only when the amplifier and transport RECORD indicators remain lit. * 1 indicator Index No. 2 * 2 indicator Index No. 15
3	PLAY pushbutton switch	Used to select the PLAY mode, or used in conjunction with the RECORD pushbutton to perform "Punch in" and "Punch out".

		Pressing the PLAY pushbutton during the F.FWD or REWIND mode stops the tape motion, then automatically starts the PLAY mode.
4	STOP pushbutton switch	Used to stop the tape transport, cancelling the existing mode of operation.
5	REWIND pushbutton switch	Used to select the REWIND mode to run the tape from right to left at high speed. This mode may be entered from any other mode except the EDIT mode.
6	F.FWD (FAST FORWARD) pushbutton switch	Used to select the F.FWD mode to run the tape from left to right at high speed. This mode may be entered from any other mode except the EDIT mode.
7	MEMORY pushbutton switch	Used to search "00.00.00" position on the tape. This mode may be entered any other mode except the EDIT mode.
8	TAPE TIMER (7-segment LED)	A 6-digit TIMER used to locate or log program material on the tape.
9	RESET pushbutton switch	Used to reset the figure of the TAPE TIMER to "00.00.00".
10	ALL INPUT pushbutton switch and indicator (yellow)	Pressing the pushbutton, the adjacent indicator lights, all the INPUT indicators lights, and the input signals are fed to the LINE OUTPUT connectors, the PHONES jack, the VU meters, and the PEAK indicators of all channels.
11	ALL SEL/REP (SELECTIVE REPRODUCTION) pushbutton switch and indicator (green)	Pressing the pushbutton, the adjacent indicator lights, all the SEL/REP indicators lights, and the programs via the record head are fed to the LINE OUTPUT connectors, the PHONES jack, the VU meters, and the PEAK indicators of all channels. Entering the RECORD mode, the monitor program on READY (Index No.14 in this table) selected

		channels are automatically switched from SEL/REP to INPUT. This function is for "Punch in" and "Punch out".
12	ALL REPROduce pushbutton switch and indicator (orange)	Pressing the pushbutton, the adjacent indicator lights, all the REPRO indicators lights, and the programs via the reproduce head are fed to the LINE OUTPUT connectors, the PHONES jack, the VU meters, and the PEAK indicators of all channels.
13	INDIVIDUAL pushbutton switch and indicator (green)	In the depressed position, the adjacent indicator lights, and INPUT or SEL/REP or REPRO mode can be selected with the Monitor Select toggle switches (Index No.19 in this table) at the individual channels.
14	READY/SAFE toggle switches	Used to select channels for recording in conjunction with the PLAY and RECORD pushbuttons. Selecting the READY position, the RECORD indicators illuminate or blink and the RECORD mode of associated channels may be entered or ready. Selecting the SAFE position, the RECORD indicators turn off and activation of associated channels RECORD mode are cancelled. (Index Nos.1, 2, 3 in this table.)
15	RECORD indicators (red)	Indicate activation of associated channel RECORD mode. (Index Nos.2, 14 in this table.)
16	INPUT indicators (yellow)	Indicate activation of associated channel INPUT mode. (Index Nos.10, 13 in this table.)
17	SEL/REP indicators (green)	Indicate activation of associated channel SEL/REP mode. (Index Nos.11, 13 in this table.)
18	REPROduce indicators (orange)	Indicate activation of associated channel REPRO mode. (Index Nos.12, 13 in this table.)
19	Monitor Select toggle switches	Used to select the monitor program. (LINE OUTPUT signal Index No.13)

Z-1	CH8	INPUT
Z-2	CH8	REPRO
Z-3	CH7	INPUT
Z-4	CH7	REPRO
Z-5	CH6	INPUT
Z-6	CH6	REPRO
Z-7	CH5	INPUT
Z-8	CH5	REPRO
Z-9	CH4	INPUT
Z-10	CH4	REPRO
Z-11	CH3	INPUT
Z-12	CH3	REPRO
Z-13	CH2	INPUT
Z-14	CH2	REPRO
Z-15	CH1	INPUT
Z-16	CH1	REPRO
Z-17	STAND BY	
Z-18	MECHA REC	
Z-19	CH8	REC
Z-20	CH7	REC
Z-21	CH6	REC
Z-22	CH5	REC
Z-23	CH4	REC
Z-24	CH3	REC
Z-25	CH2	REC
Z-26	CH1	REC
Z-27	GND E (COMMAND)	
Z-28	+5V (P.O.MA)	
Z-29	GND B (LED)	
Z-30	+20V (UNREG)	
Z-31	GND Đ (UNREG)	
Z-32	MEMORY	
Z-33	STOP COMMAND	
Z-34	F.FWD COMMAND	
Z-35	RWD COMMAND	
Z-36	PLAY COMMAND	
Z-37	REC COMMAND	
Z-38	REC LED ON	
Z-39	+5V (TIMER)	
Z-40	T.T. RESET	
Z-41	SIGN	
Z-42	TH	
Z-43	10M	
Z-44	TM	
Z-45	10S	
Z-46	TS	
Z-47	BCD DATA A	
Z-48	BCD DATA B	
Z-49	BCD DATA C	
Z-50	BCD DATA Đ	

PB9A438

A-5	N C	
A-8	N C	
A-13	CH8	INPUT
A-14	CH8	REPRO
A-11	CH7	INPUT
A-12	CH7	REPRO
A-10	CH6	INPUT
A-9	CH6	REPRO
A-7	CH5	INPUT
A-6	CH5	REPRO
A-15	CH8	REC
A-3	STAND BY	
A-4	CH7	REC
A-2	CH6	REC
A-1	CH5	REC

G-1	N C	
G-5	CH2	REPRO
G-4	CH1	INPUT
G-3	CH1	REPRO
G-2	CH1	REC

F-9	+20V (UNREG)
F-10	GND Đ
F-7	CH4 INPUT
F-8	CH4 REPRO
F-2	CH3 INPUT
F-3	CH3 REPRO
F-1	CH2 INPUT
F-6	CH4 REC
F-5	CH3 REC
F-4	CH2 REC

H-1	GND E (COMMAND)
H-3	+5V (P.O.M.A)
H-2	N C

B-8	MECHA REC
B-7	GND B (LED)
B-3	STOP COMMAND
B-2	F.FWD COMMAND
B-1	RWD COMMAND
B-4	PLAY COMMAND
B-5	REC COMMAND
B-6	REC LED ON

J-12	MEMORY
J-11	N C
J-15	+5V (TIMER)
J-13	T.T. RESET
J-10	SIGN
J-9	TH
J-8	10M
J-7	TM
J-6	10S
J-5	TS
J-14	N C
J-4	BCD DATA A
J-3	BCD DATA B
J-2	BCD DATA C
J-1	BCD DATA Đ

CB-237 CONTROL SW Assy

REC PLAY STOP F.FWD RWD

C-1	GND B (LED)
C-2	REC COMMAND
C-3	PLAY COMMAND
C-4	STOP COMMAND
C-5	F.FWD COMMAND
C-6	RWD COMMAND

I-1	GND B (LED)
I-2	+5V (P.O.M.A)
I-3	ALL INPUT
I-4	ALL REPRO
I-5	GND E(COMMAND)

CASE

Đ-1	REC LED ON
Đ-2	GND B (LED)

K-8	SEG "F"
K-7	SEG "G"
K-6	SEG "E"
K-5	SEG "Đ"
K-4	SEG "A"
K-3	SEG "B"
K-2	SEG "C"
K-1	MEMORY

L-2	T.T. RESET
L-1	+5V (TIMER)
L-3	GND Đ
L-9	TS
L-8	10S
L-7	TM
L-6	10M
L-5	TH
L-4	SIGN

Q-1	GND B (LED)
Q-2	+5V (P.O.M)
Q-3	ALL INPUT
Q-4	ALL REPRO
Q-5	GNDA (COMMAND)

PB9A443

E-1	REC LED ON
E-2	GND B (LED)

PB9A440

M-8	SEG "F"
M-7	SEG "G"
M-6	SEG "E"
M-5	SEG "Đ"
M-4	SEG "A"
M-3	SEG "B"
M-2	SEG "C"
M-1	MEMORY

N-2	T.T. RESET
N-1	+5V (TIMER)
N-3	GND Đ
N-9	TS
N-8	10S
N-7	TM
N-6	10M
N-5	TH
N-4	SIGN

O-1	GND Đ
O-2	MEMORY

PB9A444

P-1	GND Đ
P-2	MEMORY

PB9A439

VA-1	CH2 REC LED
VA-2	CH2 REC CONT
VA-3	CH2 REC
VA-4	CH2 INPUT LED
VA-5	CH2 SEL/REP LED
VA-6	CH2 REPRO LED
VA-7	CH2 REPRO CONT
VA-8	CH2 INPUT CONT
VA-9	
VA-10	
VA-11	
VA-12	CH4 REPRO
VA-13	CH4 INPUT
VA-14	CH3 REPRO
VA-15	CH3 INPUT
VA-16	CH2 INPUT
VA-17	CH2 REPRO
VA-18	CH1 INPUT
VA-19	CH1 REPRO
VA-20	
VA-21	
VA-22	
VA-23	CH1 INPUT CONT
VA-24	CH1 REPRO CONT
VA-25	CH1 REPRO LED
VA-26	CH1 SEL/REP LED
VA-27	CH1 INPUT LED
VA-28	CH1 REC
VA-29	CH1 REC CONT
VA-30	CH1 REC LED

WA-1	CH4 REC LED
WA-2	CH4 REC CONT
WA-3	CH4 REC
WA-4	CH4 INPUT LED
WA-5	CH4 SEL/REP LED
WA-6	CH4 REPRO LED
WA-7	CH4 REPRO CONT
WA-8	CH4 INPUT CONT
WA-9	CH3 INPUT CONT
WA-10	CH3 REPRO CONT
WA-11	CH3 REPRO LED
WA-12	CH3 SEL/REP LED
WA-13	CH3 INPUT LED
WA-14	CH3 REC
WA-15	CH3 REC CONT
WA-16	CH3 REC LED

VB-1	CH2 REC LED
VB-2	CH2 REC CONT
VB-3	CH2 REC
VB-4	CH2 INPUT LED
VB-5	CH2 SEL/REP LED
VB-6	CH2 REPRO LED
VB-7	CH2 REPRO CONT
VB-8	CH2 INPUT CONT
VB-9	
VB-10	
VB-11	
VB-12	CH4 REPRO
VB-13	CH4 INPUT
VB-14	CH3 REPRO
VB-15	CH3 INPUT
VB-16	CH2 INPUT
VB-17	CH2 REPRO
VB-18	CH1 INPUT
VB-19	CH1 REPRO
VB-20	
VB-21	
VB-22	
VB-23	CH1 INPUT CONT
VB-24	CH1 REPRO CONT
VB-25	CH1 REPRO LED
VB-26	CH1 SEL/REP LED
VB-27	CH1 INPUT LED
VB-28	CH1 REC
VB-29	CH1 REC CONT
VB-30	CH1 REC LED

WB-1	CH4 REC LED
WB-2	CH4 REC CONT
WB-3	CH4 REC
WB-4	CH4 INPUT LED
WB-5	CH4 SEL/REP LED
WB-6	CH4 REPRO LED
WB-7	CH4 REPRO CONT
WB-8	CH4 INPUT CONT
WB-9	CH3 INPUT CONT
WB-10	CH3 REPRO CONT
WB-11	CH3 REPRO LED
WB-12	CH3 SEL/REP LED
WB-13	CH3 INPUT LED
WB-14	CH3 REC
WB-15	CH3 REC CONT
WB-16	CH3 REC LED

YB-1	CH8 REC LED
YB-2	CH8 REC CONT
YB-3	CH8 REC
YB-4	CH8 INPUT LED
YB-5	CH8 SEL/REP LED
YB-6	CH8 REPRO LED
YB-7	CH8 REPRO CONT
YB-8	CH8 INPUT CONT
YB-9	
YB-10	
YB-11	
YB-12	CH8 REPRO
YB-13	CH8 INPUT
YB-14	CH7 REPRO
YB-15	CH7 INPUT
YB-16	CH6 INPUT
YB-17	CH6 REPRO
YB-18	CH5 INPUT
YB-19	CH5 REPRO
YB-20	
YB-21	
YB-22	
YB-23	CH7 INPUT CONT
YB-24	CH7 REPRO CONT
YB-25	CH7 REPRO LED
YB-26	CH7 SEL/REP LED
YB-27	CH7 INPUT LED
YB-28	CH7 REC
YB-29	CH7 REC CONT
YB-30	CH7 REC LED

XB-1	CH6 REC LED
XB-2	CH6 REC CONT
XB-3	CH6 REC
XB-4	CH6 INPUT LED
XB-5	CH6 SEL/REP LED
XB-6	CH6 REPRO LED
XB-7	CH6 REPRO CONT
XB-8	CH6 INPUT CONT
XB-9	CH5 INPUT CONT
XB-10	CH5 REPRO CONT
XB-11	CH5 REPRO LED
XB-12	CH5 SEL/REP LED
XB-13	CH5 INPUT LED
XB-14	CH5 REC
XB-15	CH5 REC CONT
XB-16	CH5 REC LED

YA-1	CH8 REC LED
YA-2	CH8 REC CONT
YA-3	CH8 REC
YA-4	CH8 INPUT LED
YA-5	CH8 SEL/REP LED
YA-6	CH8 REPRO LED
YA-7	CH8 REPRO CONT
YA-8	CH8 INPUT CONT
YA-9	
YA-10	
YA-11	
YA-12	CH8 REPRO
YA-13	CH8 INPUT
YA-14	CH7 REPRO
YA-15	CH7 INPUT
YA-16	CH6 INPUT
YA-17	CH6 REPRO
YA-18	CH5 INPUT
YA-19	CH5 REPRO
YA-20	
YA-21	
YA-22	
YA-23	CH7 INPUT CONT
YA-24	CH7 REPRO CONT
YA-25	CH7 REPRO LED
YA-26	CH7 SEL/REP LED
YA-27	CH7 INPUT LED
YA-28	CH7 REC
YA-29	CH7 REC CONT
YA-30	CH7 REC LED

XA-1	CH6 REC LED
XA-2	CH6 REC CONT
XA-3	CH6 REC
XA-4	CH6 INPUT LED
XA-5	CH6 SEL/REP LED
XA-6	CH6 REPRO LED
XA-7	CH6 REPRO CONT
XA-8	CH6 INPUT CONT
XA-9	CH5 INPUT CONT
XA-10	CH5 REPRO CONT
XA-11	CH5 REPRO LED
XA-12	CH5 SEL/REP LED
XA-13	CH5 INPUT LED
XA-14	CH5 REC
XA-15	CH5 REC CONT
XA-16	CH5 REC LED

元 図	生産図	取説図	TYPE
2-3417	3-6190	3-6372	

NOTES : UNLESS OTHERWISE SPECIFIED
1. RESISTANCE VALUES ARE IN OHMS, ±W. 5%.
2. CAPACITANCE VALUES ARE IN FARADS, 50V.
3. CAPACITOR SYMBOL MARKS ARE AS FOLLOWS.
+ : ALUMINUM ELECTROLYTIC CAPACITOR.
+ : BIPOLAR ALUMINUM ELECTROLYTIC CAPACITOR.
: MYLAR FILM CAPACITOR (±5%, 50V)
: POLYSTYRENE FILM CAPACITOR (±5%, 50V)
: CERAMIC CAPACITOR.
: MICA CAPACITOR (±5%)
: TANTALUM ELECTROLYTIC CAPACITOR.
: POLYPROPYLENE FILM CAPACITOR (±5%)
: LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR.
: METALLIZED PAPER CAPACITOR (±10%)
: SPARK KILLER.
⚠ : SAFETY COMPONENT ; REPLACE ONLY WITH THE SPECIFIED COMPONENT FOR SAFETY REASON.

MRK	REV. No.	DATE	DWN	APP
⚠				
⚠				
⚠				
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DRAWN 80.12.10
DESIGNED 80.12.10
CHECKED
APPROVED

OTARI Otari Electric Co.,Ltd.

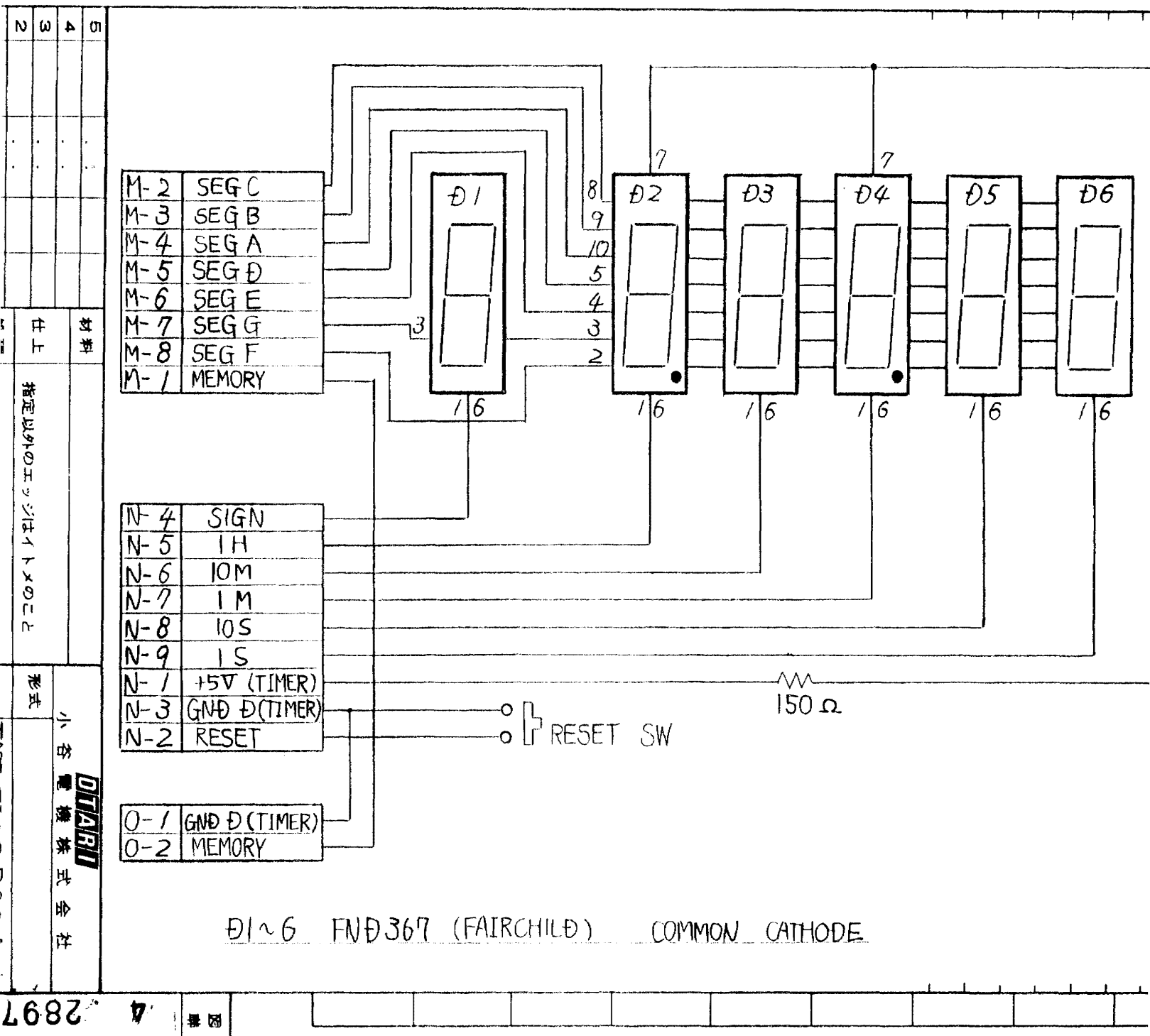
NAME CB-110

PART No. CB1100B

DWG No. 3-.6372

MODEL CB-110

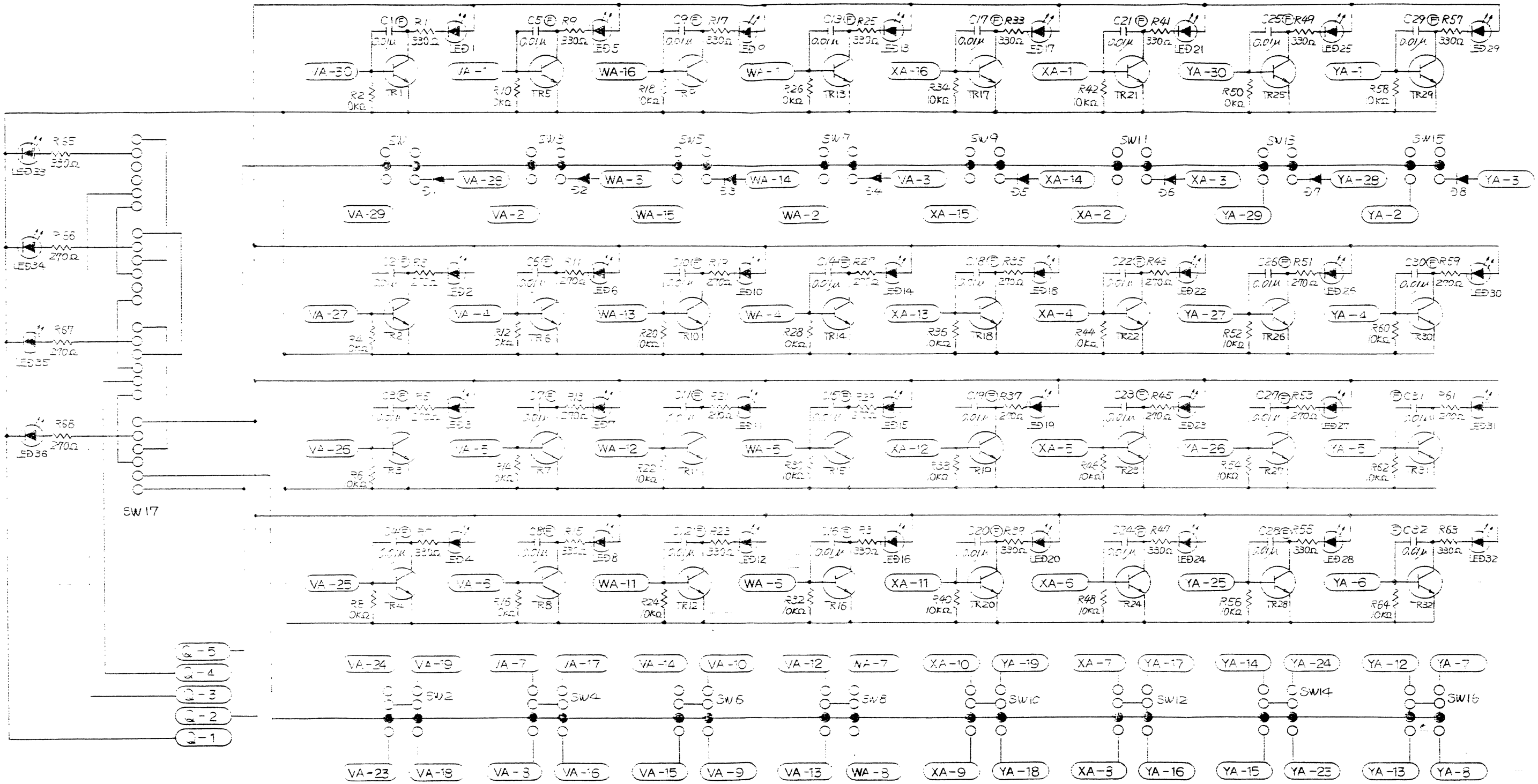
3-.6372 SHEET No.



D1~6 FND367 (FAIRCHILD) COMMON CATHODE

材料
仕上
指定以外のエッジはイトメのこと
形式
小谷電機株式会社
ATARI
2897
4
番図

元 図 番 号	取 説 図	TYPE
2-3415	3-5171	3-6373



LED NUMBER	OTARI NUMBER	DISCRIPTION
1.5.9.13.17.21.25.29	PN TLR124	TLR 24
2.6.10.14.18.22.26.30	PN TLY124	TLY 24
3.7.11.15.19.23.27.31	PN TLG124	TLG 24
4.8.12.14.20.24.28.32	PN TLO124	TLO 24

SWITCH NUMBER	OTARI NUMBER	DISCRIPTION
1.3.5.7.9.11.13.15	WH42033	LB(C)-22M-12K
2.4.6.8.10.12.14.16	WH42034	LB(C)-23M-12K
17	WH12108	SUT-41A

TRANSISTOR NUMBER	OTARI NUMBER	DISCRIPTION
TR1 ~ 32	QC 585R	2SC1685R

DIODE NUMBER	OTARI NUMBER	DISCRIPTION
D1 ~ 8	PNJIS1588	IS1558

NOTES : UNLESS OTHERWISE SPECIFIED
1. RESISTANCE VALUES ARE IN OHMS, ¼W, 5%.
2. CAPACITANCE VALUES ARE IN FARADS, 50V.
3. CAPACITOR SYMBOL MARKS ARE AS FOLLOWS.
   — : ALUMINUM ELECTROLYTIC CAPACITOR
   B : BIPOLAR ALUMINUM ELECTROLYTIC CAPACITOR.
   ± : MYLAR FILM CAPACITOR (±5%, 50V)
   S : POLYSTYRENE FILM CAPACITOR (±5%, 50V)
   C : CERAMIC CAPACITOR.
   M : MICA CAPACITOR (±5%)

T : TANTALUM ELECTROLYTIC CAPACITOR.
P : POLYPROPYLENE FILM CAPACITOR (±5%)
L : LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR.
F : METALLIZED PAPER CAPACITOR (±10%)
⊣⊢ : SPARK KILLER
4 ! : SAFETY COMPONENT. REPLACE ONLY WITH THE SPECIFIED COMPONENT FOR SAFETY REASON.

MRK	REV. No.	DATE	DWN	APP
7				
6				
5				
4				
3				
2				
1				

DRAWN 80.12.10
DESIGNED 80.12.10
CHECKED
APPROVED

OTARI Otari Electric Co.,Ltd.

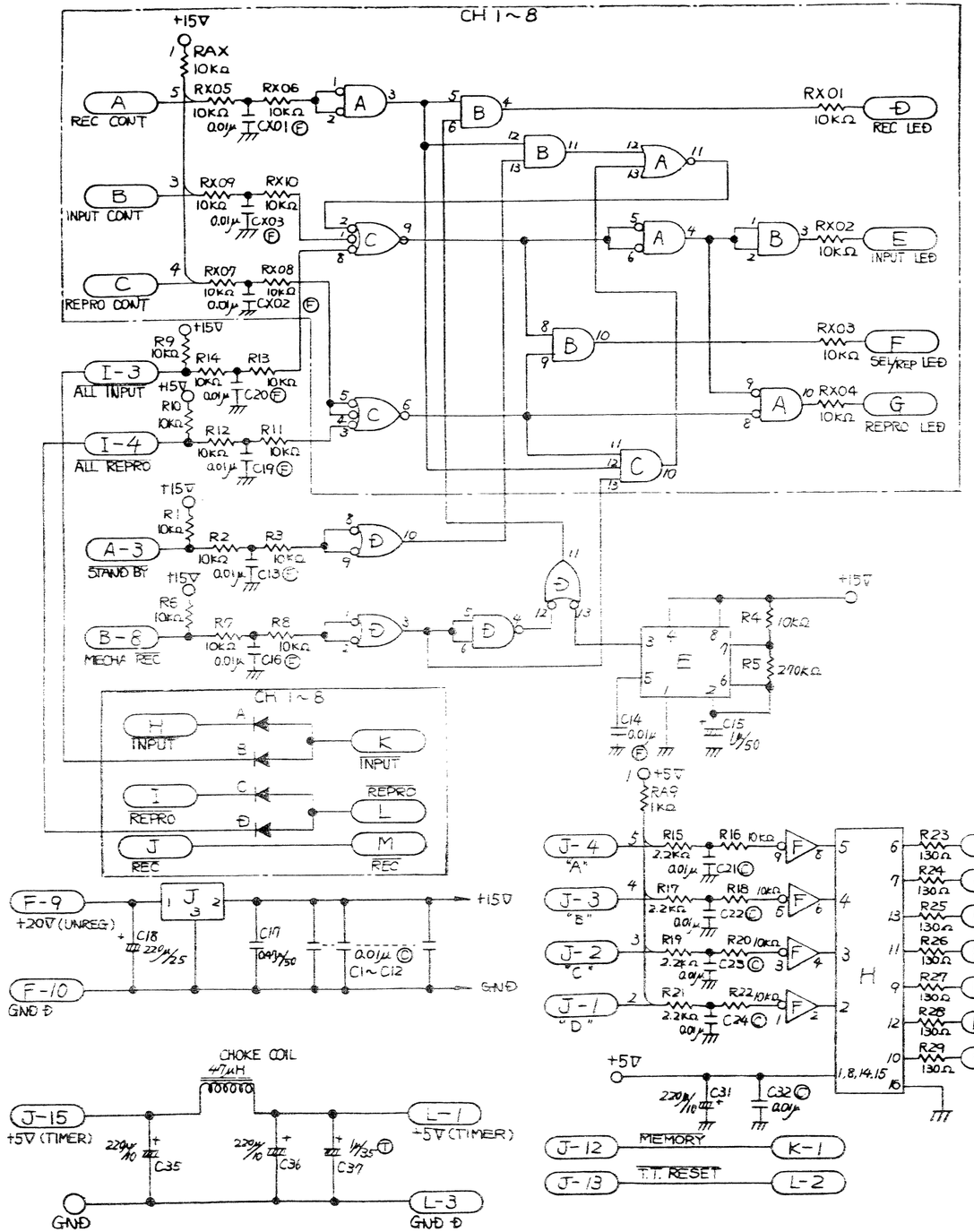
NAME MODE PCB Ass'y

PART No. PB45K0A

DWG No. 3-6373

MODEL CB-110

DWG No. 3-6373



	CONNECTOR NUMBER												
	A	B	C	D	E	F	G	H	I	J	K	L	M
CH 1	VB-29	VB-23	VB-24	VB-30	VB-27	VB-26	VB-25	VB-18	VB-19	VB-28	G-4	G-3	G-2
CH 2	VB-2	VB-8	VB-7	VB-1	VB-4	VB-5	VB-6	VB-16	VB-17	VB-3	F-1	G-5	F-4
CH 3	WB-15	WB-9	WB-10	WB-16	WB-13	WB-12	WB-11	VB-15	VB-14	WB-14	F-2	F-3	F-5
CH 4	WB-2	WB-8	WB-7	WB-1	WB-4	WB-5	WB-6	VB-13	VB-12	WB-3	F-7	F-8	F-6
CH 5	XB-15	XB-9	XB-10	XB-16	XB-13	XB-12	XB-11	YB-18	YB-19	XB-14	A-7	A-6	A-1
CH 6	XB-2	XB-8	XB-7	XB-1	XB-4	XB-5	XB-6	YB-16	YB-17	XB-3	A-10	A-9	A-2
CH 7	YB-29	YB-23	YB-24	YB-30	YB-27	YB-26	YB-25	YB-15	YB-14	YB-28	A-11	A-12	A-4
CH 8	YB-2	YB-8	YB-7	YB-1	YB-4	YB-5	YB-6	YB-13	YB-12	YB-3	A-13	A-14	A-15

	IC NUMBER		
	A	B	C
CH 1	IC12	IC13	IC11
CH 2	IC22	IC23	IC21
CH 3	IC32	IC33	IC31
CH 4	IC42	IC43	IC41
CH 5	IC52	IC53	IC51
CH 6	IC62	IC63	IC61
CH 7	IC72	IC73	IC71
CH 8	IC82	IC83	IC81

IC NUMBER	OTARI NUMBER	DISCRIPTION
A	IMC 14001	MC14001B
B	IMC 14081	MC14081B
C	IMC 14093	MC14093B

IC NUMBER		OTARI NUMBER	DISCRIPTION
D	IC 1	IMC 14001	MC14001B
E	IC 2	IRC555DB	RC555DB
F	IC 3	IMC 14584	MC14584B
G	IC 4	IMC 14584	MC14584B
H	IC 5	IMSM561	MSM561RS
I	IC 6	ITD62301	TD62301P
J	IC 7	IHC 7815	μPC7815

	DIODE NUMBER			
	A	B	C	D
CH 1	D-29	D-30	D-31	D-32
CH 2	D-25	D-26	D-27	D-28
CH 3	D-23	D-24	D-21	D-22
CH 4	D-19	D-20	D-17	D-18
CH 5	D-13	D-14	D-15	D-16
CH 6	D-9	D-10	D-11	D-12
CH 7	D-7	D-8	D-5	D-6
CH 8	D-3	D-4	D-1	D-2

DIODE NUMBER	OTARI NUMBER	DISCRIPTION
A.B.C.D	PN1S1558	1S1558

元図	生産図	取説図	TYPE
2-3416	3-6192	3-6374	

NOTES: X → CH 1~8

NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTANCE VALUES ARE IN OHMS, ±W, 5%.
2. CAPACITANCE VALUES ARE IN FARADS, 50V.
3. CAPACITOR SYMBOL MARKS ARE AS FOLLOWS.
   - ⊣⊢ : ALUMINUM ELECTROLYTIC CAPACITOR.
   - Ⓑ : BIPOLAR ALUMINUM ELECTROLYTIC CAPACITOR.
   - Ⓜ : MYLAR FILM CAPACITOR (±5%, 50V)
   - Ⓢ : POLYSTYRENE FILM CAPACITOR (±5%, 50V)
   - Ⓒ : CERAMIC CAPACITOR.
   - Ⓜ : MICA CAPACITOR (±5%)
   - Ⓣ : TANTALUM ELECTROLYTIC CAPACITOR.
   - Ⓟ : POLYPROPYLENE FILM CAPACITOR (±5%)
   - Ⓒ : LOW LEAKAGE CURRENT ELECTROLYTIC CAPACITOR.
   - Ⓜ : METALLIZED PAPER CAPACITOR (±10%)
   - ⊣⊢ : SPARK KILLER.
4. ⚠ : SAFETY COMPONENT ; REPLACE ONLY WITH THE SPECIFIED COMPONENT FOR SAFETY REASON.

MARK	REV. No.	DATE	DWN	APP

DRAWN 80.12.10
DESIGNED 80.12.10
CHECKED
APPROVED

OTARI Otari Electric Co.Ltd

NAME CONTROL P.C.B Assy

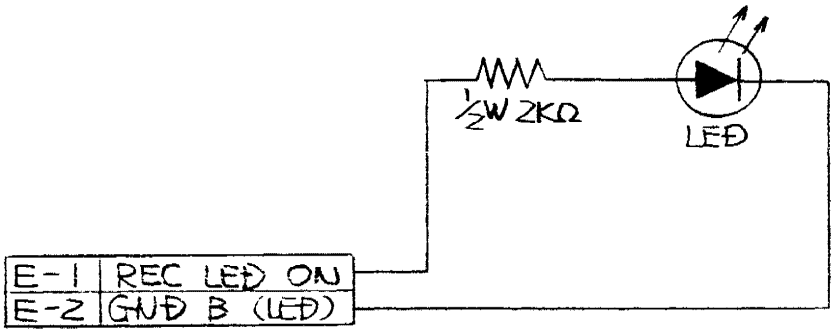
PART No. PB45L0A

DWG No. 3-.6374

MODEL CB-110

DWG No. 3-.6374

部番	図番	品番	品名，定格	個数	備考



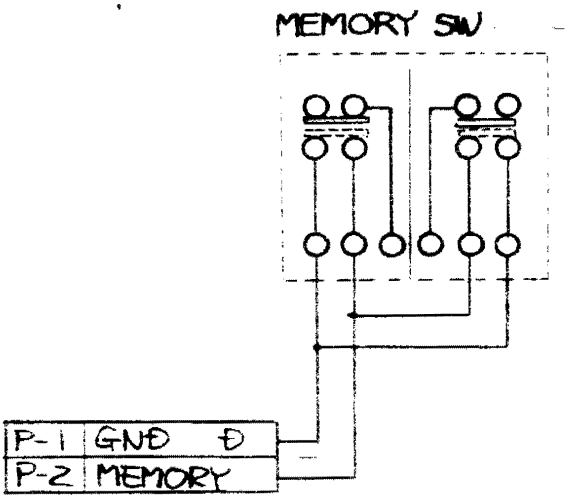
LED	
OTARI NUMBER	DISCRIPTION
PNTLR124	TLR 124 (RED)

元図	生産図	取説図	TYPE
4-28864	4-28968	4-28969	

5					材料		OTARI 小谷電機株式会社			
4					仕上	指定以外のエッジはイトメのこと	形式			
3							品名	REC LED P.C.B Assy		
2					処理		図名	CIRCUIT DIAGRAM		
1							品番	PB76P0A		
記号	改訂番号	年月日	担当	承認	普通寸法差	OS JIS — 級				
承認		検図 イシイ 81.4.9	設計	80.10.30	製図	尺度	第三角法 単位 mm			

02-37.10-80-5.000

図番
4-28969



MEMORY SW	
OTARI NUMBER	DISCRIPTION
WH12109	SUT シリーズ

元図	生産図	取説図	TYPE
4-28999	4-28865	4-29000	

5					材料			OTARI 小谷電機株式会社	
4									
3					仕上	指定以外のエッジはイトメのこと		形式	
2									
1					処理			品名	MEMORY SW P.C.B Assy
記号	改訂番号	年月日	担当	承認	等級	OS	JIS — 級	図名	CIRCUIT DIAGRAM
承認		検図 イシイ 91.4.9	設計	90.10.30	製図		尺度	第三角法	図番 PB96W OA

4-29000

EP-57 10-88-5.000